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[See page 271.]

"LIVING BRIDGE" FORMED OF THE AERIAL ROOTS OF THE INDIA-RUBBER AND OTHER KINDS OF FIGS.

# HIMALAYAN JOURNALS.

NOTES OF A NATURALIST

IN BENGAL, THE SIKKIM AND NEPAL HIMALAYAS,  
THE KHASIA MOUNTAINS, &c.

By JOSEPH DALTON HOOKER, M.D. R.N. F.R.S.

A NEW EDITION, CAREFULLY REVISED AND CONDENSED.

IN TWO VOLUMES.—VOL. II.

WITH WOODCUTS.

LONDON:  
JOHN MURRAY, ALBEMARLE STREET.  
1855.

203. G. 171.



LONDON:  
BRADBURY AND EVANS, PRINTERS, WHITEFRIARS.



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## CHAPTER XVII.

### EXCURSION TO TERAI.

Dispatch collections—Acorns—Heat—Punkabaree—Bees—Titalya—Earthquake—Proceed to Nepal frontier—Terai, geology of—Physical features of Himalayan valleys—Elephants, purchase of, &c.—Mechi river—Return to Titalya—Leave for Teesta—Jeelpigoree—Cooches—Alteration in the appearance of country by fires, &c.—Grasses—Cottages—Rajah of Cooch Behar—Condition of people—Hooli festival—Ascend Teesta—Canoes—Cranes—Forest—Baikant-pore—Rummai—Exit of Teesta—Canoe voyage down to Rangamally—Birds—Beautiful scenery—Botanising on elephants—Willow—Iron—Lohar-ghur—Coal and sandstone beds—Mechi fisherman—Hailstorm—Ascent to Dorjiling.

HAVING arranged the collections (amounting to eighty loads) made during 1848, they were conveyed by coolies to the foot of the hills, where carts were provided to carry them five days' journey to the Mahanuddee river, which flows into the Ganges, whence they were transported by water to Calcutta.

On the 27th of February, I left Dorjiling to join Mr. Hodgson, at Titalya on the plains. The weather was raw, cold, and threatening; snow lay here and

there, and all vegetation was very backward, and wore a wintry garb. The laurels, maples, and deciduous-leaved oaks, hydrangea and cherry, were leafless, but the abundance of chesnuts and evergreen oaks, rhododendrons, Aucuba, and other shrubs, kept the forest well clothed. The oaks had borne a very unusual number of acorns during the last season, which were now falling, and strewing the road in some places so abundantly, that it was hardly safe to ride down hill.

The plains of Bengal were all but obscured by a dense haze, partly owing to a peculiar state of the atmosphere that prevails in the dry months, and partly to the fires raging in the Terai forest, from which white wreaths of smoke ascended, stretching obliquely for miles to the eastward, and filling the air with black particles of grass-stems, carried 4000 feet aloft by the heated ascending currents that impinge against the flanks of the mountains.

The evening was sultry and close, the heated surface of the earth seemed to load the atmosphere with warm vapours, and the sensation, as compared with the cool pure air of Dorjiling, was that of entering a confined tropical harbour after a long sea-voyage; and the forest, which had looked so gigantic on my arrival the previous year, now appeared small after the far more lofty and bulky oaks and pines of the upper regions.

I slept in the little bungalow of Punkabaree, and was awakened next morning by sounds to which I had long been a stranger, the voices of innumerable birds,

and the humming of great bees that bore large holes for their dwellings in the beams and rafters of houses : never before had I been so forcibly struck with the absence of animal life in the regions of the upper Himalaya.

Breakfasting early, I pursued my way in the so-called cool of the morning, but this was neither bright nor fresh ; the earth was dusty and parched ; while the sun rose through a murky yellowish atmosphere with ill-defined orb. Thick clouds of smoke pressed upon the plains, and the faint easterly wind wafted large flakes of grass charcoal sluggishly along. Coarse, ill-favoured vultures wheeled through the air, languid Bengalees replaced the active mountaineers, jackal-like curs teemed at every village, and ran howling away from the onslaught of my Alpine dog ; and the tropics, with all their beauty of flower and genial warmth, looked as forbidding and unwholesome as they felt oppressive to a frame that had so long breathed the fresh mountain air.

Mounted on a stout pony, I enjoyed my scamper of sixteen miles over the wooded plains and undulating gravelly slopes of the Terai, intervening between the foot of the mountains and Siligoree bungalow. In the afternoon I rode on leisurely to Titalya, sixteen miles further, along the banks of the Mahanuddee. The atmosphere was so hazy, that objects a few miles off were invisible, and the sun quite concealed, though its light was so powerful that no part of the sky could be steadily gazed upon. During the afternoon the wind blew with violence, but being hot and dry, brought no

relief to my unacclimated frame. My pony alone enjoyed the freedom of the plains, and the 'gallop or trot being fatiguing in the heat, I tried in vain to keep him at a walk; his spirits did not last long, however, for he flagged after a few days' of tropical heat. My little dog had run thirty miles the day before, exclusive of all the detours he had made for his own enjoyment, and he became so tired after twenty more this day, that I had to take him on my saddle-bow, where, after licking his hot swollen feet, he fell fast asleep.

At Titalya bungalow, I received a hearty welcome from Mr. Hodgson, and congratulations on the success of my Nepal journey, which afforded a theme for many conversations.

In the evening we had three sharp jerking shocks of an earthquake in quick succession, at 9·8 P.M., appearing to come up from the southward: they were accompanied by a hollow rumbling sound like that of a waggon passing over a wooden bridge. They were felt strongly at Dorjiling, and registered by Mr. Muller at 9·10 P.M.: we had accurately adjusted our watches (chronometers) the previous morning, and the motion may therefore fairly be assumed to have been transmitted northwards through the intervening distance of forty miles, in two minutes. Both Mr. Muller and Mr. Hodgson had noted a much more severe shock at 6·10 P.M. the previous evening, which I, who was walking down the mountain, did not experience; this caused a good deal of damage at Dorjiling, in cracking well-built walls. Earthquakes are frequent all along the Himalaya, and are felt far in

Tibet; they are, however, most common towards the eastern and western extremities of India; owing in the former case to the proximity of the volcanic forces in the bay of Bengal. Cutch and Scinde, as is well known, have suffered severely on many occasions, and in several of them the motion has been propagated through Afghanistan and Little Tibet, to the heart of Central Asia.

On the morning of the 1st of March, Dr. Campbell arrived from his tour of inspection along the frontier of Bhotan; and we accompanied him as far as the Mechi river, which bounds Nepal on the east.

Terai is a name applied to a tract of country at the very foot of the Himalaya: the word is Persian, and signifies damp. Politically, the Terai generally belongs to the hill-states beyond it; geographically, it should appertain to the plains of India; and geologically, it is a sort of neutral country, being composed neither of the alluvium of the plains, nor of the rocks of the hills, but for the most part of alternating beds of sand, gravel, and boulders brought from the mountains; the soil being generally light, dry, and gravelly. Botanically it is readily defined as the region of forest-trees; amongst which the Sal, the most valuable of Indian timber, is conspicuous in most parts, though not in Sikkim, where it has been destroyed. The Terai varies in breadth, from ten miles on the Sikkim frontier, to thirty and more on the Nepalese. In the latter country it is called the Morung, and supplies Sal and Sissoo timber for the Calcutta market, the logs being floated down the Konki and Cosi rivers

to the Ganges. The gravel-beds extend upon the plains for fully twenty miles south of the Sikkim mountains, the gravel becoming smaller as the distance increases, and large blocks of stone not being found beyond a few miles from the Himalaya itself, even in the beds of rivers, however large and rapid. Throughout its breadth this formation is conspicuously cut into flat-topped terraces, flanking the spurs of the mountains, at elevations varying from 250 to nearly 1000 feet above the sea. This deposit contains no fossils; and its general appearance and mineral constituents are the only evidence of its origin, which is no doubt due to a retiring ocean that once washed the base of the Sikkim Himalaya, received the contents of its rivers, and, wearing away its bluff spurs, spread a talus upwards of 1000 feet thick along its shores.

The alluvium of the Gangetic valley was no doubt deposited in deep water, whilst the coarser matter was accumulating at the foot of the mountains.

This view has occurred, I believe, to almost every observer, at whatever part of the base of the Himalaya he may have studied this deposit. Its position indicates its recent formation; but it still remains a subject of the utmost importance to discover the extent and nature of the ocean to whose agency it is referred. The alluvium of the Gangetic valley may to a great degree be the measure of the denudation which the Himalaya has suffered along its Indian watershed. It was, no doubt, during the gradual rise of that chain from the ocean, that the gravel and alluvium were deposited; and in the terracing and alternation of

these deposits, there is evidence that there have been many subsidences and elevations of the coast-line, during which the gravel has suffered greatly from denudation.

I never looked at the Sikkim Himalaya from the plains without comparing its bold spurs enclosing sinuous river gorges, to the weather-beaten front of a mountainous coast; and in following any of its great rivers, the scenery of its deep valleys no less strikingly resembles that of such narrow arms of the sea (or fiords) as characterise every mountainous coast, of whatever geological formation: such as the west coasts of Scotland and Norway, of South Chili and Fuegia, of New Zealand and Tasmania. There are too in these Himalayan valleys terraced pebble-beds, rising in some cases eighty feet above the rivers, which I believe could only have been deposited by them when they debouched into deep water; and both these, and the beds of the rivers, are strewed with masses of rock. Such accumulations and transported blocks are seen on the raised beaches of our narrow Scottish salt water lochs, exposed by the rising of the land, and they are yet forming of immense thickness on many coasts by the joint action of tides and streams.

In every Himalayan valley which I ascended, I met with ancient moraines at or about 7000 or 8000 feet elevation, proving, that at one period, the glaciers descended fully so much below the position they now occupy: this can only be explained by a change of climate, or by a depression of the mountain mass equal to 8000 feet, since the formation of these moraines.



The country about Titalya looks desert, from that want of trees and cultivation, so characteristic of the upper level throughout this part of the plains, which is covered with short, poor, pasture-grass.

Shortly after Dr. Campbell's arrival, the meadows about the bungalow presented a singular appearance, being dotted over with elephants, brought for purchase by Government. It was curious to watch the arrival of these enormous animals, which were visible nearly two miles across the flat plains; nor less interesting was it to observe the wonderful docility of these giants of the animal kingdom, often only guided by naked boys, perched on their necks, scolding, swearing, and enforcing their orders with an iron goad. There appeared as many tricks in elephant-dealers as in horse-jockeys, and of many animals brought, but few were purchased. Government limits the price to about 75*l.*, and the height to the shoulder must not be under seven feet, which, incredible as it appears, may be estimated within a fraction as being three times the circumference of the forefoot. The pedigree is closely inquired into, the feet are examined for cracks, the teeth for age, and many other points attended to.

The Sikkim frontier, from the Mahanuddee westward to the Mechi, is marked by a row of tall posts. The country is undulating; and though fully 400 miles from the ocean, and not sixty from the top of the loftiest mountain on the globe, its average level is not 300 feet above that of the sea. The upper levels are gravelly, and loosely covered with scattered thorny

jujube bushes, occasionally tenanted by the Florican, which scours these downs like a bustard. Sometimes a solitary fig, or a thorny acacia, breaks the horizon, and there are a few gnarled trees of the scarlet *Butea frondosa*.

At this season few insects but grasshoppers are to be seen, even mosquitos being rare. Birds, however, abound, and we noticed the common sparrow, hoopoe, water-wagtail, skylark, osprey, and several egrets.

We arrived on the third day at the Mechi river, to the west of which the Nepal Morung begins, whose belt of Sal forest loomed on the horizon, so raised by refraction as to be visible as a dark line, from the distance of many miles. It is, however, very poor, all the large trees having been removed. We rode for several miles into it, and found the soil dry and hard, but supporting a prodigious undergrowth of gigantic harsh grasses that reached to our heads, though we were mounted on elephants. Tigers, wild elephants, and the rhinoceros, are said to be found here ; but we saw none.

The old and new Mechi rivers are several miles apart, but flow in the same depression, a low swamp many miles broad, which is grazed at this season, and cultivated during the rains. The grass is very rich, partly owing to the moisture of the climate, and partly to the retiring waters of the rivers ; both circumstances being the effects of proximity to the Himalaya. Hence cattle (buffalos and the common humped cow of India) are driven from the banks of the Ganges 300 miles to these feeding grounds, for the use of which a

trifling tax is levied on each animal. The cattle are very carelessly herded, and many are carried off by tigers.

Having returned to Titalya, Mr. Hodgson and I set off in an eastern direction for the Teesta river, whose embouchure from the mountains to the plains I was anxious to visit. Though the weather is hot, and oppressively so in the middle of the day, there are few climates more delicious than that of these grassy savannahs from December to March. We always started soon after daybreak on ponies, and enjoyed a twelve to sixteen miles' gallop in the cool of the morning before breakfast, which we found prepared on our arrival at a tent sent on ahead the night before. The route led across an open country, or followed paths through interminable rice-fields, now dry and dusty. On poor soil a white-flowered *Leucas* monopolised the space, like our charlock and poppy : it was apparently a pest to the agriculturist, covering the surface in some places like a sprinkling of snow.

On the second day we arrived at Jeelpigoree, a large straggling village near the banks of the Teesta, a good way south of the forest : here we were detained for several days, waiting for elephants with which to proceed northwards. The natives are Cooches, a Mogul (Mongolian) race, who inhabit the open country of this district, replacing the Mechis of the Terai forest. They are a fine athletic people, not very dark, and formed the once powerful house of Cooch Behar. Latterly the upper classes have adopted the religion of the Brahmins, and have had caste conferred upon them ;

while the lower orders have turned Mahometans : these, chiefly agriculturists, are a timid, oppressed class, who everywhere fled before us, and were with difficulty prevailed upon even to direct us along our road. A rude police is established by the British Government all over the country, and to it the traveller applies for guides and assistance ; but the Cooches were so shy and difficult to deal with, that we were generally obliged to depend on our own resources. Turf is the prevailing feature of the country, there being few shrubs, and still fewer trees. Goats and the common Indian cow are plentiful, but it is not swampy enough for the buffalo, and sheep are scarce, on account of the heat of the climate. This uniformity of feature over so immense an area is, however, due to the agency of man, and is of recent introduction ; as all concur in affirming, that within the last hundred years the face of the country was covered with the same tall jungle-grasses which abound in the Terai forest ; and the troops cantoned at Titalya (a central position) from 1816 to 1828, confirm this statement as far as that immediate neighbourhood is concerned.

These gigantic grasses seem to be destroyed by fire with remarkable facility at one season of the year ; and it is well that this is the case ; for, whether as a retainer of miasma, a shelter for wild beasts, both carnivorous and herbivorous, alike dangerous to man, or from their liability to ignite, and spread destruction far and wide, the grass-jungles are most serious obstacles to civilisation. Next to the rapidity with which it can be cleared, the adaptability of a great part of the soil to irrigation

during the rains, has greatly aided the bringing of it under cultivation.

At Jeelpigoree we were waited upon by the Dewan, who governs the district for the Rajah, a boy about ten years old, whose estates are locked up during the trial of an interminable suit for the succession, that has been instituted against him by a natural son of the late Rajah : we found the Dewan to be a man of intelligence, who promised us elephants as soon as the great Hooli festival, now commenced, should be over.

The large village, at the time of our visit, was gay with holiday dresses. It was surrounded by trees, chiefly of banyan, jack, mango, peepul, and tamarind : endless rice-fields extended on all sides, but except bananas, slender betel-nut palms, and sometimes pawn, or betel-pepper, there was little other cultivation. The rose-apple, orange, and pine-apple were rare, as were cocoa-nuts ; there were few date or fan-palms, and only occasionally poor crops of castor-oil and sugar-cane. In the gardens I noticed many of the very commonest Indian ornamental plants ; while for food were cultivated *Chenopodium*, yams, sweet potatoes, and more rarely peas, beans, and gourds. Bamboos were planted round the little properties and smaller clusters of houses in oblong squares, the ridge on which the plants grew being usually bounded by a shallow ditch. The species selected was not the most graceful, the stems being densely crowded, erect, as thick at the base as the arm, copiously branching, and very feathery throughout their whole length of sixty feet.

The cottages were remarkable, presenting nothing but a low white-washed platform of clay, and an enormous high, narrow, black, neatly-thatched roof, so arched along the ridge, that its eaves nearly touched the ground at each gable; looking at a distance like a gigantic round-backed elephant. The walls were of neatly-platted bamboo: each window (of which there were two) was crossed by slips of bamboo, and wanted only glass to make it look European; they had besides, shutters of wattle, that opened upwards, projecting during the day like the port-hatches of a ship, and let down at night. Within, the rooms were airy and clean; one end contained the machans (bedsteads), the other some raised clay benches, the fire, frequently an enormous Hookah, round wattled stools, and various implements. The inhabitants appeared more than ordinarily well-dressed; the men in loose flowing robes of fine cotton or muslin, the women in the usual garb of a simple thick cotton cloth, drawn tight immediately above the breast, and thence falling perpendicularly to the knee; the colour of this was a bright blue in stripes, bordered above and below with red.

I anticipated some novelty from a visit to a Durbar (court) so distant from European influence as that of the Rajah of Jeelpigoree. All Eastern courts, subject to the Company, are, however, now shorn of much of their glory; and the condition of the upper classes is greatly changed.

One evening we visited the young Rajah at his residence, which had rather a good appearance at a distance, its white walls gleaming through a dark tope

of mango, betel, and cocoa-nut. A short rude avenue led to the entrance, under the trees of which a large bazaar was being held; stocked with clothes, simple utensils, ornaments, sweetmeats, fish from the Teesta, and betel-nuts.

We entered through a guard-house, where were some of the Rajah's Sepoys in European costume, and a few of the Company's troops, lent to the Rajah as a security against some of the turbulent pretenders to his title. Within was a large court-yard flanked by a range of buildings, some of good stone-work, some of wattle, in all stages of disrepair. A great crowd of people occupied one end of the court, and at the other we were received by the Dewan, and seated on chairs under a canopy supported by slender silvered columns. Some slovenly Natch-girls were dancing before us, kicking up clouds of dust, and singing or rather bawling through their noses, the usual indelicate hymns in honour of the Hooli festival; there were also fiddlers, cutting uncouth capers in rhythm with the dancers. Anything more deplorable than the music, dancing, and accompaniments, cannot well be imagined; yet the people seemed vastly pleased, and extolled the performers.

The arrival of the Rajah and his brothers was announced by a crash of tom-toms and trumpets, while over their heads were carried gilt canopies. With them came a troop of relations, of all ages; and amongst them a poor little black girl, dressed in honour of us in an old-fashioned English chintz frock and muslin cap, in which she cut the drollest figure imaginable;

she was carried about for our admiration, like a huge Dutch doll, crying lustily all the time.

The festivities of the evening commenced by handing round trays full of pith-balls, the size of a nutmeg, filled with a mixture of flour, sand, and red lac-powder; with these each pelted his neighbour, the thin covering bursting as it struck any object, and powdering it copiously with red dust. A more childish and disagreeable sport cannot well be conceived; and when the balls were expended, the dust itself was resorted to, not only fresh, but that which had already been used was gathered up, with whatever dirt it might have become mixed. One rude fellow, with his hand full, sought to entrap his victims into talking, when he would stuff the nasty mixture into their mouths.

At the end attar of roses was brought, into which little pieces of cotton, fixed on slips of bamboo, were dipped, and given to each person. The heat, dust, stench of the unwashed multitude, noise, and increasing familiarity of the lower orders, warned us to retire, and we effected our retreat with precipitancy.

The Rajah and his brother were very fine boys, lively, frank, unaffected, and well disposed: they have evidently a good guide in the old Dewan; but it is melancholy to think how surely, should they grow up in possession of their present rank, they will lapse into slothful habits, and take their place amongst the imbeciles who now represent the once powerful Rajahs of Bengal.

We rode back to our tents by a bright moonlight, very dusty and tired, and heartily glad to breathe



the cool fresh air, after the stifling ordeal we had undergone.

On the following evening the elephants were again in waiting to conduct us to the Rajah. He and his relations were assembled outside the gates, mounted upon elephants, amid a vast concourse of people. The children and Dewan were seated in a sort of cradle; the rest were some in howdahs, and some astride on elephants' backs, six or eight together. All the idols were paraded before them, and powdered with red dust; the people howling, shouting, and quarrelling. When the mob had sufficiently pelted one another with balls and dirty red powder, a torchlight procession was formed, headed by the idols, to a very large tank, bounded by a high rampart, within which was a broad esplanade round the water.

The effect of the whole scene was very striking, the glittering cars and barbaric gaud of the idols showing best by torchlight; while the white robes and turbans of the undulating sea of people, and the great black elephants picking their way with matchless care and consideration, contrasted strongly with the quiet moonbeams sleeping on the still broad waters of the tank.

Thence the procession moved to a field, where the idols were placed on the ground, and all dismounted: the Dewan then took the children by the hand, and each worshipped his tutelary deity in a short prayer dictated by the attendant Brahmin, and threw a handful of red dust in its face. After another ordeal of powder, singing, dancing, and suffocation, our share in the Hooli ended; and having been promised

elephants for the following morning, we bade a cordial farewell to our engaging little hosts and their staid old governor.

On the 10th of March we left for Rangamally, a village eight miles distant in a northerly direction, our course lying along the west bank of the Teesta.

The river is here navigated by canoes, thirty to forty feet long, some being rudely cut out of a solid log of Sal, while others are built, the planks, of which there are but few, being sewed together, or clamped with iron, and the seams caulked with the fibres of the root of Dhak (*Butea frondosa*), and afterwards smeared with the gluten of *Diospyros embryopteris*.

The whole country improved in fertility as we advanced towards the mountains; the grass became greener, and more trees, shrubs, herbs, and birds appeared. Flocks of cranes were abundant over-head, flying in wedges, or breaking up into "open order," preparing for their migration northwards, which takes place in April, their return occurring in October; a small quail was also common on the ground. Tamarisk grew in the sandy bed of the river; its flexible young branches are used in various parts of India for wattling and basket-making.

In the evening we walked to the skirts of the Sal forest. The great trunks of the trees were often scored by tigers' claws, this animal indulging in the cat-like propensity of rising and stretching itself against such objects.

At Rangamally, the height of the sandy banks of the Teesta varies from fifteen to twenty feet. The bed is a

mile across and all sand, but the stream does not occupy one-third of this space; the current is much divided, and opaque green, from the glacial origin of most of its head-streams. The west bank was covered with a small Sal forest, mixed with *Acacia Catechu*, and brushwood, growing in a poor vegetable loam, over very dry sand.

The opposite (or Bhotan) bank is much lower, and always flooded during the rains, which is not the case on the western side, where the water rises to ten feet below the top of the bank, or from seven to ten feet above its height in the dry season, and when it fills its whole bed. This information we had from a police Jemandar, who has resided many years on this unhealthy spot, and annually suffers from fever. The Sal forest has been encroached upon from the south, for many miles, within the memory of man, by clearing in patches, and by indiscriminate felling.

About ten miles north of Ranganally, we came to an extensive flat, occupying a recess in the high west bank, the site of the old capital (Bai-kant-pore) of the Jeelpigorees Rajah. Hemmed in as it is on three sides by a dense forest, and on all by many miles of malarious Terai, it appears sufficiently secure from ordinary enemies, during a great part of the year.

About eight miles on, we left the river-bed, and struck westerly through a dense forest, to a swampy clearance occupied by the village of Rummai, which appeared thoroughly malarious; and we pitched our tent on a narrow low ridge, above the level of the plain.

In the evening we rode into the forest (which was dry and very unproductive), and thence along the river-banks, through *Acacia Catechu*, belted by *Sissoo*, which often fringes the stream, always occupying the lowest flats. The foliage at this season is brilliantly green; and as the evening advanced, a yellow convolvulus burst into flower like magic, adorning the bushes over which it climbed.

On the following morning we left for the exit of the Teesta, proceeding northwards, sometimes through a dense forest of Sal timber, sometimes dipping into marshy depressions, or riding through grassy savannahs, breast-high. The coolness of the atmosphere was delicious, and the beauty of the jungle seemed to increase the further we penetrated into these primeval forests.

Eight miles from Rummai we came on a small river from the mountains, with a Cooch village close by, inhabited during the dry season by timber-cutters from Jeelpigoree.

We here mounted the elephants, and proceeded several miles through the prairie, till we again struck upon the high Sal forest-bank: it formed one of many terraces which stretch along the foot of the hills, from Punka-baree to the Teesta, but of which none are said to occur for eight miles eastwards along the Bhotan Dooars: if true, this is probably due in part to the alteration of the course of the Teesta, which is gradually working to the westward, and cutting away these lofty banks.

The Sal bank formed a very fine object: it was quite

perpendicular, and beautifully stratified with various coloured sands and gravel: it tailed off abruptly at the junction of the rivers, and then trended away south-west, forming the west bank of the Teesta. The latter river is at its outlet a broad and rapid, but hardly impetuous stream, now fifty yards across, gushing from between two low forest-clad spurs: it appeared about five feet deep, and was beautifully fringed on both sides with green Sissoo.

Some canoes were here waiting for us, formed of hollowed trunks of trees, thirty feet long: two were lashed together with bamboos, and the boatmen sat one at the head and one at the stern of each: we lay along the bottom of the vessels, and in a second we were darting down the river, at the rate of at least ten or fifteen miles an hour, the bright waters leaping up on all sides, and bounding in *jets-d'eau* between prows and sterns of the coupled vessels. Sometimes we glided along without perceptible motion, and at others jolted down bubbling rapids, the steersmen straining every nerve to keep their bark's head to the current, as she impatiently swerved from side to side in the eddies. On our jaded and parched frames, after the hot forenoon's ride on the elephants, the effect was delicious: the fresh breeze blew on our heated foreheads and down our open throats; we dipped our hands into the clear, cool stream, and there was "music in the waters" to our ears. Fresh verdure on the banks, clear pebbles, soft sand, long English river-reaches, forest glades, and deep jungles, followed in rapid succession; and as often as we rounded a bend or

shot a rapid, the scene changed from bright to brighter still; so continuing until dusk, when we were slowly paddling along the then torpid current opposite Rangamally.

The absence of large stones or boulders of rock in the bed of the Teesta is very remarkable, considering the great volume and rapidity of the current, and that it shoots directly from the rocky hills to the gravelly plains. At the *embouchure* there are boulders as big as the head, and in the stream, four miles below the exit, the boatmen pointed out a stone as large as the body as quite a marvel.

They assured us that the average rise at the mouth of the river, in the rains, was not more than five feet: the mean breadth of the stream is from seventy to ninety yards. From the point where it leaves the mountains, to its junction with the Megna, is at this season thirteen days' voyage, the return occupying from twenty to twenty-five days, with the boats unladen. The name "Teesta" signifies "quiet," this river being so in comparison with other Himalayan torrents further west, the Cosi, Konki, &c., which are devastators of all that bounds their course.

We passed but two crossing-places: at one the river is divided by an island, covered with the rude chaits and flags of the Boodhists. We also saw some Cooch fishermen, who throw the net much as we do: a fine "Mahaser" (a very large carp) was the best fish they had. Of cultivation there was very little, and the only habitations were a few grass-huts of the boatmen or buffalo herdsman, a rare Cooch village of Catechu and

Sal cutters, or the shelter of timber-floaters, who seem to pass the night in nests of long dry grass.

On the 14th of March we proceeded west to Siligoree, along the skirts of the ragged Sal forest. Birds are certainly the most conspicuous branch of the natural history of this country, and we saw many species, interesting either from their habits, beauty, or extensive distribution. We noticed no less than sixteen kinds of swimming birds, several of which are migratory and English. The Shoveller, white-eyed and common wild ducks : Merganser, Brahminee, and Indian goose, common and Gargany teal ; two kinds of gull ; one of Shearwater ; three of tern, and one of cormorant. Besides these there were three egrets, the large crane, stork, green heron, and the demoiselle ; the English sand-martin, king-fisher, peregrine-falcon, sparrowhawk, kestrel, and the European vulture ; the wild peacock, and jungle-fowl. There were at least 100 peculiarly Indian birds in addition, of which the more remarkable were several kinds of mina, starling, vulture, kingfisher, magpie, quail, and lapwing.

The country gradually became quite beautiful, much undulated and varied by bright green meadows, sloping lawns, and wooded streams, which led from the Sal forest and meandered through this varied landscape. More beautiful sites for fine mansions could not well be, and it is difficult to suppose so lovely a country should be so malarious as it is before and after the rains, excessive heat probably diffusing widely the miasma from small stagnant surfaces. We noticed a wild hog ; absolutely the first wild beast of any size I

saw on the plains, except the spiny hare, and the barking deer. The hare we found to be the best game of this part of India, except the teal. The pheasants of Dorjiling are poor, the deer all but uneatable, and the florican, however dressed, I considered a far from excellent bird.

A good many plants grow along the streams, the sandy beds of which are everywhere covered with the marks of tigers' feet. The only safe way of botanising is by pushing through the jungle on elephants; an uncomfortable method, from the quantity of ants and insects which drop from the foliage above, and from the risk of disturbing pendulous bees' and ants' nests. A peculiar species of willow is common here; which is a singular fact, as the genus is characteristic of cold and arctic latitudes, and no species is found below 8000 feet elevation on the Sikkim mountains, where it grows on the inner Himalaya only, some kinds ascending to 16,000 feet.

The latter part of the journey I performed on elephants during the heat of the day, and a more uncomfortable mode of conveyance surely never was adopted; the camel's pace is more fatiguing, but that of the elephant is extremely trying after a few miles, and is so injurious to the human frame that the Mahouts (drivers) never reach an advanced age, and often succumb young to spine-diseases, brought on by the incessant motion of the vertebral column. The broiling heat of its black back, and the odour of its oily driver, are disagreeable accompaniments, as are its habit of snorting water from its trunk over its parched



skin, and the consequences of the great bulk of green food which it consumes.

The Duabanga is the pride of these forests. Its trunk, from eight to fifteen feet in girth, is generally forked from the base, and the long pendulous branches which clothe the trunk for 100 feet, are thickly leafy, and terminated by racemes of immense white flowers, which, especially when in bud, smell most disagreeably of *assafœtida*.

The report of a bed of iron-stone eight or ten miles west of Punkabaree determined us on visiting the spot; and the locality being in a dense jungle, the elephants were sent on a-head.

Lohar-ghur, or "iron hill," lies in a thick dry forest. Its plain-ward flanks are very steep, and covered with scattered weather-worn masses of ochreous and black iron-stone, many of which are several yards long: it fractures with faint metallic lustre, and is very earthy in parts; it does not affect the compass. There are no pebbles of iron-stone, nor water-worn rocks of any kind found with it.

Below Punkabaree the Baisarbatti stream cuts through banks of gravel overlying the tertiary sand-stone. The latter is gritty and micaceous, intercalated with beds of indurated shale and clay; in which I found the shaft (apparently) of a bone. In the bed of the stream were carbonaceous shales, with obscure impressions of fossil fern leaves, characteristic of the Burdwan coal-fields, but too imperfect to justify any conclusion as to the relation between these formations.

Ascending the stream, these shales are seen *in situ*, overlain by the metamorphic clay-slate of the mountains. This is at the foot of the Punkabaree spur, and close



A MECH, NATIVE OF THE SIKKIM TERAÍ.

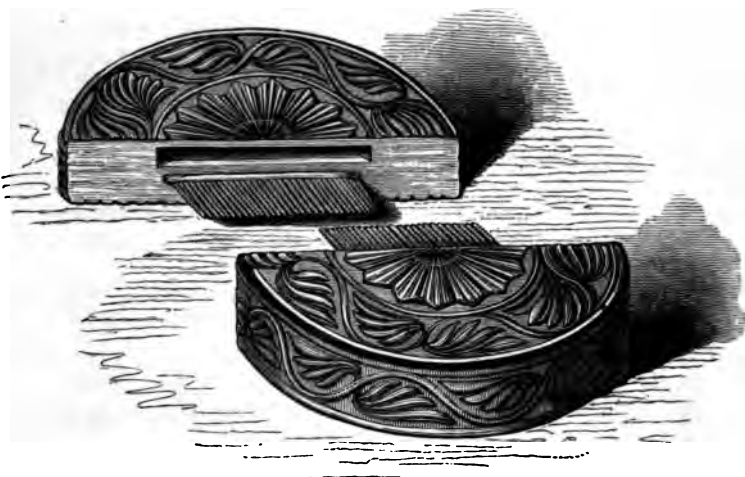
to the bungalow, where a stream and land-slip expose good sections. The coal-seams are few in number, six to twelve inches thick, very confused, and full of

nodules of quartzite slate, covered with concentric scaly layers of coal. These scanty notices being collected in a country clothed with the densest tropical forest, where a geologist pursues his investigations under disadvantages that can hardly be realised in England, will I fear long remain unconfirmed.

A poor Mech was fishing in the stream, with a basket curiously formed of a cylinder of bamboo, cleft all round in innumerable strips, held together by the joints above and below, and stretched out as a balloon in the middle, and kept apart by a hoop: a small hole is cut in the cage, and a mouse-trap entrance formed; the cage is placed in the current with the open end upwards, where the fish get in, and though little bigger than minnows, cannot find their way out.

On the 20th we had a change in the weather: a violent storm from the south-west occurred at noon, with hail of a strange form, the stones being sections of hollow spheres, half an inch across and upwards, formed of cones with truncated apices and convex bases; these cones were aggregated together with their bases outwards. The large masses were followed by a shower of separate conical pieces, and that by heavy rain. On the mountains this storm was most severe; the stones lay at Dorjiling for seven days, congealed into masses of ice several feet long and a foot thick in sheltered places: at Purnea, fifty miles south, stones one and two inches across fell, probably as whole spheres. When we reached Dorjiling on the 24th of March, we found that the hail which had

fallen on the 20th was still lying in great masses of crumbling ice in sheltered spots. The fall had done great damage to the gardens, and Dr. Campbell's tea-plants were cut to pieces.



POCKET-COMB USED BY THE MECH TRIBES.

## CHAPTER XVIII.

Arrangements for second journey into Sikkim—Opposition of Dewan—Lassoo Kajee—Tendong—Legend of flood—Lama of Silok-foke—Namtchi—Tchebu Lama—Top of Tendong—Gigantic oak—Plants—Teesta valley—Commencement of rains—Bhomsong—Ascent to Lathiang—View—Gorh—Opposition of Lama—Arrival of Meepo—Cross Teesta—Difficulties of travelling—Lepchas swimming—Moxa for sprains—Singtam—Singtam Soubah—Bees'-nests and honey-seekers—Land-slips—Leeches, &c.—Chakoong—Vegetation—Gravel terraces—Unpleasant effects of wormwood—Choongtam, scenery and vegetation of—Inhabitants—Tibetan salute—Lamas—Difficulty of procuring food—Venomous snakes—Hornets and other insects—Choongtam temple—Pictures of Lhasa—Scenery.

AFTER my return to Dorjiling, I was occupied during the month of April in preparations for an expedition to the loftier parts of Sikkim. The arrangements were the same as for my former journey, except with regard to food, which it was necessary should be sent out to me at intervals; for I had had ample proof that the resources of the country were not equal to provisioning a party of from forty to fifty men, even had the Dewan been favourable to my travelling, which was clearly not the case.

Dr. Campbell communicated to the Rajah my intention of starting early in May for the upper Teesta valley, and, in the Governor-General's name, requested

that he would facilitate my visiting the frontier of Sikkim, north-east of Kinchinjunga. The desired permission was, after a little delay, received; which appeared to rouse the Dewan to institute a series of obstructions to my progress, which led to so many delays that my exploration of the country was not concluded till October, and I was prevented returning to Dorjiling before the following Christmas.

Since Dr. Campbell's and my visit to the Rajah in December, no Vakeel (agent) had been sent by the Durbar to Dorjiling, and consequently we could only communicate indirectly with his Highness, while we found it impossible to ascertain the truth of various reports promulgated by the Dewan, and meant to deter me from entering the country. In April, the Lassoo Kajee was sent as Vakeel, but, having on a previous occasion been dismissed for insolence and incapacity, and again rejected when proposed by the Dewan at Bhomsong, he was refused an audience; and he retired exasperated, pretending that he had orders to delay my starting, and that he was prepared to use strong measures should I cross the frontier.

No notice was taken of these threats; the Rajah was again informed of my intended departure, unless his orders to the contrary were received through a proper accredited agent, and I left Dorjiling on the 3rd of May, accompanied by Dr. Campbell, who saw me fairly over the frontier.

Arrangements were made for supplies of rice following me by instalments; our daily consumption being 80 lbs., a man's load. After crossing into Sikkim, I

mustered my party at the Great Rungeet river. I had forty-two in all, of whom the majority were young Lepchas, all were active and cheerful-looking fellows; only one was goitred, and he had been a salt-trader. I was accompanied by a guard of five Sepoys, and had a Lepcha and Tibetan interpreter. I took but one personal servant, a Portuguese half-caste who cooked for me; he was a native of Calcutta, and though hardy, patient, long-suffering, and far better tempered, was, in other respects, very inferior to my servant of the previous year, who, having been bred to the sea, was as handy as he was clever; but who, like all other natives of the plains, grew intolerably weary of the hills, and left me.

The first part of my route lay over Tendong, a conspicuous feature from Dorjiling, where it is known as Mount Ararat. The Lepchas have a curious legend of a man and woman having saved themselves on its summit, during a flood that once deluged Sikkim. The coincidence of this story with the English name of Ararat suggests the probability of the legend being fabulous; but I am positively assured that it is not so, and that it was current amongst the Lepchas before its English name was heard of, the latter having been suggested from the form of its summit resembling that given in children's books as the resting-place of the ark.

On the route I was met by the Lama of Silokfoke Goompa. Though a resident on the Lassoo Kajee's estates, he politely brought me a present, at the same time apologising for not waiting till I had encamped, owing to his excessive fat, which prevented his

climbing. I accepted his excuses, though well aware that the real reason was that he wished to pay his respects, and show his good feeling, in private. Besides his ordinary canonicals, he carried a tall crozier-headed staff, and had a curious horn slung round his neck, full of amulets ; it was short, of a transparent red colour, and beautifully carved, and was that of the small cow of Lhassa.

Namtchi was once a place of considerable importance ; and still possesses a mendong, with six rows of inscribed slabs, a temple, and a Lama attached thereto ; the latter waited on me soon after I had encamped ; but he brought no present, and I was not long kept in suspense as to his motives. These people are poor dissemblers ; if they intend to obstruct, they do it clumsily and hesitatingly : in this instance the Lama first made up to my people, and, being coolly received, kept gradually edging up to my tent-door, where, after an awkward salute, he delivered himself with a very bad grace of his mission, which was from the Lassoo Kajee to stop my progress. I told him I knew nothing of the Lassoo Kajee or his orders, and should proceed on the following morning : he then urged the bad state of the roads, and requested me to wait till he should receive orders from the Rajah ; upon which I dismissed him.

Soon afterwards I saw twenty or thirty men rapidly descending the rocky path ; they were Lepchas, with blue and white striped garments, bows and quivers, and long knives gleaming in the sun : they seemed to be following a Lama with a scarlet handkerchief wound



round his head, its ends streaming out behind him. Though expecting this apparition to prove the renowned Kajee and his myrmidons, coming to put a termination to my progress, I could not help admiring the picturesqueness of the scenery and party. My fears were soon dissipated by my men joyfully shouting, "The Tchebu Lama! the Tchebu Lama!" and I soon recognised the rosy face and twinkling eyes of my friend of Bhomsong, the only man of intelligence about the Rajah's court, and the one whose services as Vakeel were particularly wanted at Dorjiling.

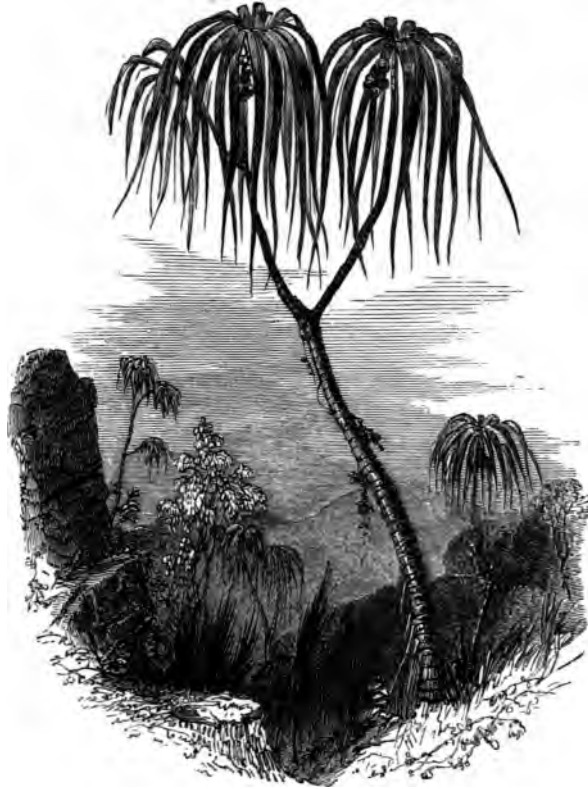
He told me that the Lassoo Kajee had orders (from whom, he would not say) to stop my progress, but that I should proceed nevertheless, and that there was no objection to my doing so; and he despatched a messenger to the Rajah, announcing my progress and requesting him to send me a guide, and to grant me every facility, asserting that he had all along fully intended doing this.

On the following morning I continued the ascent of Tendong, by a narrow winding path, covered with oaks, rhododendrons, and various shrubs, not found at equal elevation on the wetter Dorjiling ranges. The last ascent is up a steep rounded cone with a broad flat top, covered with dwarf bamboo, a few oaks, laurels, magnolias, and white-flowered rhododendron trees, which obstructed the view. I hung the barometers near one of the many chaits on the summit, where there is also a rude temple, in which worship is performed once a year; and found the elevation to be 8,671 feet.

The descent on the north side was steep, through a rank vegetation, very different from that of the south face. The oaks are very grand, and I measured one (whose trunk was decayed and split into three, however), which I found to be 49 feet in girth at 5 feet from the ground.

From Temi the road descends to the Teesta, the course of which it afterwards follows. The valley was fearfully hot, and infested with mosquitos and peepsas. Many fine plants grew in it: I especially noticed an *Aristolochia*, which climbs the loftiest trees, bearing its curious pitcher-shaped flowers near the ground only; its leaves are said to be good food for cattle. *Houttuynia*, a curious herb allied to pepper, grew on the banks, which, from the profusion of its white flowers, resembled strawberry-beds; the leaves are eaten by the Lepchas. But the most magnificent plant of these jungles is *Hodgsonia*, (a genus I have dedicated to my friend Mr. Hodgson,) a gigantic climber allied to the gourd, bearing immense yellowish-white pendulous blossoms, whose petals have a fringe of buff-coloured curling threads several inches long. The fruit is of a rich brown, like a small melon in form, and contains six large nuts whose kernels are eaten. The stem, when cut, discharges water profusely from whichever end is held downwards. The "Took" (*Hydnocarpus*) is a beautiful evergreen tree, with tufts of yellow blossoms on the trunk; its fruit is as large as an orange, and is used to poison fish, while from the seeds an oil is expressed. Tropical oaks and *Terminalias* are the giants of these low forests; the latter especially, having

buttressed trunks, appear truly gigantic ; one measured 47 feet in girth, at 5 feet, and 21 at 15 feet from the



BORÉ, PANDANUS.

ground ; and was fully 200 feet high. I could only procure the leaves by firing a ball into the crown.

The rains commenced on the 10th of May, moderating the heat by drenching thunder-storms, but greatly

increasing the discomforts of travelling, and so soaking the men's loads, that I was obliged to halt a day in the Teesta valley to have waterproof covers made of platted bamboo-work, enclosing *Phrynium* leaves. I was delighted to find that my little tent was impervious to water, though its thickness was but of one layer of blanket: it was a single ridge with two poles, 7 feet high, 8 feet long, and 8 feet broad at the base, forming nearly an equilateral triangle in front.

Bhomsong was looking more beautiful than ever in its rich summer clothing of tropical foliage. I halted during an hour of heavy rain on the spot where I had spent the previous Christmas, and could not help feeling doubly lonely in a place where every rock and tree reminded me of that pleasant time. The isolation of my position, the hostility of the Dewan, and consequent uncertainty of the success of a journey that absorbed all my thoughts, the prevalence of fevers in the valleys I was traversing, and the many difficulties that beset my path, all crowded on the imagination when fevered by exertion and depressed by gloomy weather, and my spirits involuntarily sank as I counted the many miles and months intervening between me and my home.

The little flat on which I formerly encamped was now covered with a bright green crop of young rice. The house then occupied by the Dewan was now empty and unroofed; but the suspension bridge had been repaired, and its light framework of canes, spanning the boiling flood of the Teesta, formed a graceful object in this beautiful landscape. I had rather expected to

meet either with a guide, or with some further obstruction here, but as none appeared, I proceeded onwards as soon as the weather moderated.

Higher up, the banks are so steep as to allow of no road, and the path ascends from the river, for nearly 4000 feet, to Lathiang village, up a wild, rocky torrent that descends from Mainom.

From the village the view was superb, embracing the tropical gulley, with the flat of Bhomsong deep in the gorge, its bright rice-fields gleaming like an emerald amid the dark vegetation that surrounded it; the Teesta winding to the southward; the pine-clad rocky top of Mainom to the south-west; the cone of Tendong far to the south; to the north, black mountains tipped with snow; and to the east the magnificent snowy range of Chola, crowning the valley of the Ryott with a diadem of frosted silver.

Descending to Gorh (4,100 feet), I was met by the Lama of that district, a tall, disagreeable-looking fellow, who informed me that the road ahead was impassable. The day being spent, I was obliged to camp at any rate; after which he visited me in full canonicals, bringing me a handsome present, but assuring me that he had no authority to let me advance. I treated him with civility, and regretted my objects being so imperative, and my orders so clear, that I was obliged to proceed on the following morning; on which he abruptly decamped, as I suspected, in order to damage the road and bridges. He came again at daylight, and expostulated further; but finding it of no use, he volunteered to accompany me, officiously offering me

the choice of two roads. I asked for the coolest, knowing that it was useless to try and outwit him in such matters. At the first stream the bridge was destroyed, but seeing the planks peeping through the bushes in which they had been concealed, I desired the Lama to repair it, which he did without hesitation. So it was at every point: the path was cumbered with limbs of trees, crossing-stones were removed from the streams, and all natural difficulties were increased. I kept constantly telling the Lama that as he had volunteered to show me the road, I felt sure he intended to remove all obstacles, and accordingly I put him to all the trouble I possibly could, which he took with a very indifferent grace. When I arrived at the swinging bridge across the Teesta, I found the canes were loosened, and slips of bamboo, so small as nearly to escape observation, were ingeniously placed low down over the single bamboo that formed the footing, intended to trip up the unwary passenger, and overturn him into the river, which was deep, and with a violent current. Whilst the Lama was cutting these, one of my party found a charcoal writing on a tree, announcing the speedy arrival from the Rajah of my old guide, Meepo; and he shortly afterwards appeared, with instructions to proceed with me, though not to the Tibetan frontier. The lateness of the season, the violence of the rains, and the fears, on the Rajah's part, of my coming to mischief through fever or accident, were all urged to induce me to return, or at least only to follow the west branch of the Teesta to Kinchinjunga. These reasons failing, I was threatened

with Chinese interference on the frontier. All these objections I overruled, by refusing to recognise any instructions that were not officially communicated to the Superintendent of Dorjiling.

The Gorh Lama here took leave of me; he was a friend of the Dewan, and was rather surprised to find that the Rajah had sent me a guide, and now attempted to pass himself off as my friend, pompously charging Meepo with the care of me, and bidding me a very polite farewell. I could not help telling him civilly, but plainly, what I thought of him; and so we parted.

Meepo was very glad to join my party again; he was a thorough Lepcha in heart, a great friend of his Rajah and of Tchebu Lama, and one who both feared and hated the Dewan. He assured me of the Rajah's good wishes and intentions, but spoke with great doubt as to the probability of a successful issue to my journey: he was himself ignorant of the road, but had brought a guide, whose appearance, however, was against him, and who turned out to be sent as a spy on us both.

Instead of crossing the Teesta here, we kept on for two days up its west bank, to a cane bridge at Lingo, where the bed of the river is still only 2000 feet above the sea, though 45 miles distant from the plains, and flowing in a valley bounded by mountains 12,000 to 16,000 feet high. The heat was oppressive, from the closeness of the atmosphere, the great power of the sun, now high at noon day, and the reflection from the rocks. Leeches and stinging flies of various

kinds began to swarm as the damp increased. My clothes were drenched with perspiration during five hours of every day, and the crystallising salt irritated the skin. On sitting down to rest, I was overcome with languor and sleep, and, but for the copious supply of fresh water everywhere, travelling would have been intolerable. The coolies were all but naked, and were constantly plunging into the pools of the rivers; they are powerful swimmers, and will stem a very strong current, striking out with each arm alternately. It is an animated sight when twenty or thirty of these swarthy children of nature are disporting their muscular figures in the water, diving after large fish, and sometimes catching them by tickling them under the stones.

My servant having severely sprained his wrist by a fall, the Lepchas wanted to apply a moxa, which they do by lighting a piece of puff-ball, or of Nepal paper (that burns like tinder), laying it on the skin, and blowing it till a large open sore is produced: they shook their heads at my treatment, which consisted in transferring some of the leeches from our persons to the inflamed part.

After crossing the Teesta our route lay over a ridge 5,500 feet high; hence a rapid descent leads to the village of Singtam, 3000 feet above the river, which is here no longer called the Teesta, but the Lachen-Lachoong, from its double origin in the rivers of these names, which unite at Choongtam, twenty miles higher up. Of these, the source of the Lachen is in the Cholamoo lakes in Tibet; while the Lachoong rises on



the south flank of Donkia mountain, both many marches north of my present position.

At Singtam I was waited on by the Soubah of the district, a tall portly Bhotea, who was destined to prove the most active enemy to my pursuits. He governs the country between Gorh and the Tibet frontier, for the Maha-Ranee (wife of the Rajah), whose dowry it is; and she being the Dewan's relative, I had little assistance to expect from her agent. His conduct was very polite, and he brought me a handsome offering for myself; but after delaying me a day on the pretext of collecting food for my people, I was obliged to move on with no addition to my store, and trust to obtaining some at the next village, or from Dorjiling. Owing, however, to the increasing distance, and the destruction of the roads by the rains, my supplies from that place were becoming irregular: I therefore thought it prudent to reduce my party, by sending back my guard of Sepoys, who could be of no further use.

From this point the course of the Teesta is materially different from what it is lower down; it becomes a boisterous torrent, as suddenly as the Tambur does, above Mywa Guola. Its bed is narrower, large masses of rock impede its course, nor is it practicable for rafts at any season; the only means of passing it being by cane bridges that are thrown across, high above the stream.

The slope on either side of the valley is very steep; that on the north, in particular, appearing too precipitous for any road, and being only frequented by honey-seekers, who scale the rocks by cane ladders,

and thus reach the pendulous bees'-nests, which are so large as in some instances to be conspicuous features at the distance of a mile. This pursuit appeared extremely perilous, the long thread-like canes in many places affording the only footing over many yards of cliff: the procuring of this honey, however, is the only means by which many of the idle poor raise the rent which they must pay to the Rajah.

The most prominent effect of the steepness of the valleys is the prevalence of land-slips, which sometimes descend for 3000 feet, carrying devastation along their course; they are caused either by the melting of the snow-beds on the mountains, or by the action of the rains on the rocks; and are much increased in effect and violence by the heavy timber-trees which, swaying forwards, loosen the earth at their roots, and give impetus to the mass. This phenomenon is as frequent and destructive as in Switzerland, where, however, more lives are lost, from the country being more populous, and from the people recklessly building in places particularly exposed to such accidents. A most destructive one had occurred here the previous year, by which a village was destroyed, together with twelve of its inhabitants, and all the cattle. I crossed its debris on the first march beyond Singtam; the whole face of the mountain appeared more or less torn up for fully a mile, presenting a confused mass of white clay, full of angular masses of rock. The path was very difficult and dangerous, being carried along the steep slope, at an angle, in some places, of  $35^{\circ}$ ; and it was constantly shifting, from the continued downward

sliding, and from the action of streams, some of which are large, and cut deep channels. In one I had the misfortune to lose my only sheep, which was carried away by the torrent. These streams were crossed by means of sticks and ricketty bamboos, and the steep sides (sometimes twenty or thirty feet high) were ascended by notched poles.

Leeches swarmed in incredible profusion in the streams and damp grass, and among the bushes: they got into my hair, hung on my eyelids, and crawled up my back. I repeatedly took upwards of a hundred from my legs, where the small ones used to collect in clusters on the instep: the sores which they produced were not healed for five months afterwards, and I retain the scars to the present day. Snuff and tobacco leaves are the best antidote, but when marching in the rain, it is impossible to apply this simple remedy. The best plan I found to be rolling the leaves over the feet, inside the stockings, and powdering the legs with snuff.

Another pest is a small midge, or sand-fly, which causes intolerable irritation, and is in this respect the most insufferable torment in Sikkim; the minutest rent in one's clothes is detected by this insatiable bloodsucker, which is itself so small as to be barely visible without a microscope. We daily arrived at our camping ground, streaming with blood, and mottled with the bites of peepsas, gnats, midges, and mosquitos, besides being infested with ticks.

As the rains advanced, insects seemed to be called into existence in countless swarms; moths, cock-

chafers, glow-worms, and cockroaches, made my tent a Noah's ark by night, when the candle was burning; together with winged ants, May-flies, flying earwigs, and many beetles, while a very large species of daddy-long-legs swept across my face as I wrote my journal, or plotted off my map. After putting out the light, they gradually departed, except a few which could not find the way out, and remained to disturb my slumbers.

Chakoong is a remarkable spot in the bottom of the valley, at an angle of the Lachen-Lachoong, which here receives an affluent from a mountain 17,557 feet high, on the Chola range to the east. There is no village, but some grass huts used by travellers, which are built close to the river on a very broad flat, fringed with alder, hornbeam, and birch: the elevation is 4,400 feet, and many European genera not found about Dorjiling, and belonging to the temperate Himalaya, grow intermixed with tropical plants that are found no further north. The birch, willow, alder, and walnut grow side by side with wild plantain, and gigantic bamboos: figs, balsams, peppers, and gigantic climbing vines, grow mixed with brambles, speedwell, forget-me-not, and nettles that sting like poisoned arrows. The wild English strawberry is common, but bears a tasteless fruit: its inferiority is however counterbalanced by the abundance of a grateful yellow raspberry. Parasitical Orchids cover the trunks of oaks, while *Thalictrum* and *Geranium* grow under their shade. *Monotropa* and *Balanophora*, both parasites on the roots of trees (the one a native of north Europe and the other of tropical latitudes), push their leafless

stems and heads of flowers through the soil together : and lastly, tree-ferns grow associated with the brake and *Lycopodium* of our British moors ; and amongst mosses, the superb Himalayan *Lyellia crispa*, with the English *Funaria hygrometrica*.

The dense jungles of Chakoong completely cover the beautiful flat terraces of sand and gravel, which rise in three shelves to 150 feet above the river, and whose edges appear as sharply cut as if the latter had but lately retired from them. Everywhere immense boulders are scattered about, some of which are sixty feet long : their surfaces are water-worn into hollows, proving the river to have cut through nearly 300 feet of deposit, which once floored its valley. Lower down the valley, and fully 2000 feet above the river, I had passed numerous angular blocks resting on gentle slopes where no land-slips could possibly have deposited them, and which I therefore refer to ancient glacial action ; one of these was nearly square, eighty feet long, and ten high.

It is a remarkable fact, that this hot, damp gorge is never malarious ; this is attributable to the coolness of the river, and to the water on the flats not stagnating ; for at Choongtam, 1500 feet higher, fevers and ague prevail in summer on similar flats, but which have been cleared of jungle, and are therefore exposed to the sun.

I had had constant headache for several mornings on waking, which I did not fail to attribute to coming fever, or to the unhealthiness of the climate ; till I accidentally found it to arise from the wormwood (the common English *Artemisia vulgaris*), upon a thick couch

of the cut branches of which I was accustomed to sleep, and which in dry weather produced no such effects.

From Chakoong to Choongtam the route lay northwards, following the course of the river, or crossing steep spurs that dip into the valley, and leave no space between their perpendicular sides and the furious torrent. Immense land-slips seamed the steep mountain flanks; and we crossed with precipitation one that extended fully 4000 feet (and perhaps much more) up a mountain 12,000 feet high; it moves every year, and the mud and rocks shot down by it were strewn with the green leaves and twigs of shrubs, some of the flowers on which were yet fresh and bright, while others were crushed: these were mixed with gigantic trunks of pines, with ragged bark and scored timbers. The talus which had lately been poured into the valley formed a gently sloping bank, twenty feet high, over which the Lachen-Lachoong rolled from a pool above, caused by the damming up of its waters. On either side of the pool were cultivated terraces, fifty feet high, whose alder-fringed banks, joined by an elegant cane-bridge, were reflected in the placid water; forming a little spot of singular quiet and beauty, that contrasted with the savage grandeur of the surrounding mountains, and the headstrong course of the foaming torrent below, amid whose deafening roar it was impossible to speak and be heard.

The mountain behind Choongtam is about 10,000 feet high; it divides the Lachen from the Lachoong river, and terminates a range that runs for twenty-two miles south from the lofty mountain of Kinchinjhow.

Its south exposed face is bare of trees, except clumps of pines towards the top, and is very steep, grassy, and rocky, without water. The scenery much resembles that of Switzerland, and of the north-west Himalaya, especially in the great contrast between the southern



CANE-BRIDGE AND TUKCHAM MOUNTAIN.

and northern exposures, the latter being always clothed with a dense vegetation. At the foot of this very steep mountain is a broad triangular flat, 300 feet above the river, to which it descends by three level cultivated shelves. The village, consisting of a temple and twenty houses, is placed on the slope of the hill. I camped

on the flat in May, before it became very swampy : it was covered with tufts of sedge and fringed with scarlet rhododendron, walnut, *Andromeda*, and small trees of a *Photinia*, a plant allied to hawthorn, of the leaves of which the natives make tea. Rice cultivated in pools surrounded by low banks, was just peeping above ground ; and scanty crops of millet, maize, and buckwheat flourished on the slopes around.

The inhabitants of Choongtam are of Tibetan origin ; few of them had seen an Englishman before, and they flocked out, displaying the most eager curiosity : the Lama and Phipun (or superior officer) of the Lachoong valley came to pay their respects with a troop of followers, and there was lolling out of tongues, and scratching of ears, at every sentence spoken, and every object of admiration. This extraordinary Tibetan salute at first puzzled me excessively, nor was it until reading MM. Huc and Gabet's travels on my return to England, that I knew of its being the *ton* at Lhasa, and in all civilised parts of Tibet.

As the valley was under the Singtam Soubah's authority, I experienced a good deal of opposition ; and the Lama urged the wrath of the gods against my proceeding. This argument, I said, had been disposed of the previous year, and I was fortunate in recognising one of my Changachelling friends, who set forth my kindly offices to the Lamas of that convent, and the friendship borne me by its monks, and by those of Pemiongchi. Many other modes of dissuading me were attempted, but with Meepo's assistance I succeeded in gaining my point. The



difficulty and delays in the remittance of food, caused by the land-slips having destroyed the road, had reduced our provisions to a very low ebb; and it became not only impossible to proceed, but necessary to replenish my stores on the spot. At first provisions enough were brought to myself, for the Rajah had issued orders for my being cared for, and having some practice among the villagers in treating rheumatism and goîtres, I had the power of supplying my own larder; but I found it impossible to buy food for my people. At last, the real state of the case came out; that the Rajah having gone to Choombi, his usual summer-quarters in Tibet, the Dewan had issued orders that no food should be sold or given to my people, and that no roads were to be repaired during my stay in the country; thus cutting off my supplies from Dorjiling, and, in short, attempting to starve me out. At this juncture, Meepo received a letter from the Durbar, purporting to be from the Rajah, commanding my immediate return, on the grounds that I had been long enough in the country for my objects: it was not addressed to me, and I refused to receive it as an official communication; following up my refusal by telling Meepo that if he thought his orders required it, he had better leave me and return to the Rajah, as I should not stir without directions from Dr. Campbell, except forwards. He remained, however, and said he had written to the Rajah, urging him to issue stringent orders for my party being provisioned.

We were reduced to a very short allowance before

the long-expected supplies came, by which time our necessities had almost conquered my resolution not to take by force of the abundance I might see around, however well I might afterwards pay. It is but fair to state that the improvident villagers throughout Sikkim are extremely poor in vegetable food at this season, when the winter store is consumed, and the crops are still green. They are consequently obliged to purchase rice from the lower valleys, which, owing to the difficulties of transport, is very dear; and to obtain it they barter wool, blankets, musk, and Tibetan produce of all kinds. Still they had cattle, which they would willingly have sold to me, but for the Dewan's orders.

I have seldom had occasion to allude to snakes, which are rare and shy in most parts of the Himalaya; I, however, found an extremely venomous one at Choongtam; a small black viper, a variety of the cobra di capello, which it replaces in the drier grassy parts of the interior of Sikkim, the large cobra not inhabiting the mountain regions. Altogether I only collected about twelve species in Sikkim, seven of which are venomous, and all are dreaded by the Lepchas. An enormous hornet nearly two inches long, was here brought to me alive in a cleft-stick, lolling out its great thorn-like sting, from which drops of a milky poison distilled: its sting is said to produce fatal fevers in men and cattle, which may very well be the case, judging from that of a smaller kind, which left great pain in my hand for two days, while a feeling of numbness remained in the arm for several weeks.

It is called Vok by the Lepchas, a common name for any bee: its larvæ are said to be greedily eaten, as are those of various allied insects.

Choongtam boasts a profusion of beautiful insects, amongst which the British swallow-tail butterfly disports itself in company with magnificent black, gold, and scarlet-winged butterflies, so typical of the Indian tropics. At night my tent was filled with small water-beetles that quickly put out the candle; and with lovely moths came huge cockchafers and enormous and foetid flying-bugs, which bear great horns on the thorax. The irritation of mosquito and midge bites, and the disgusting insects that clung with spiny legs to the blankets of my tent and bed, were often as effectual in banishing sleep, as were my anxious thoughts regarding the future.

The temple at Choongtam is a poor wooden building, but contains some interesting drawings of Lhassa, with its extensive Lamaseries and temples; they convey the idea of a town, gleaming, like Moscow, with gilded and copper roofs; but on a nearer aspect it is found to consist of a mass of stone houses, and large religious edifices many stories high, the walls of which are regularly pierced with small square ornamented windows.

The weather in May was cloudy and showery, but the rain which fell was far less in amount than that at Dorjiling: during the day the sun's power was great; but though it rose between five and six A.M., it never appeared above the lofty peaked mountains that girdle the valley till eight A.M. Dark firs crest the heights

around, and landslips score their flanks with white seams below; while streaks of snow remain throughout the month at 9000 feet above; and everywhere silvery torrents leap down to the Lachen and Lachoong.



*JUNIPERUS RECURVA* (height 30 feet).

## CHAPTER XIX.

Routes from Choongtam to Tibet frontier—Choice of that by the Lachen river—Arrival of supplies—Departure—Features of the valley—Eatable *Polygonum*—Cross Taktoong river—Pines, larches, and other trees—Chateng pool—Water-plants and insects—Tukcham mountain—Lamteng village—Inhabitants—Alpine monkey—Botany of temperate Himalaya—European and American fauna—Japanese and Malayan genera—Superstitious objections to shooting—Customs of people—Rain—Run short of provisions—Altered position of Tibet frontier—Zemu Samdong—Imposition—Vegetation—Uses of pines—Ascent to Thlonok river—*Balanophora* wood for making cups—Snow-beds—Eatable mushrooms and *Smilacina*—View of Kinchinjunga—Arum-roots, preparation of for food—Liklo mountain—Behaviour of my party—Bridge constructed over Zemu—Cross river—Alarm of my party—Camp on Zemu river.

FROM this place there were two routes to Tibet, each of about six days' journey. One lay to the north-west up the Lachen valley to the Kongra Lama pass, the other to the east up the Lachoong to the Donkia pass. To both Donkia and Kongra Lama I had every right to go, and was determined, if possible, to reach them, in spite of Meepo's ignorance, our guide's endeavours to frighten my party and mislead myself, and the country people's dread of incurring the Dewan's displeasure.

The Lachen valley being pronounced impracticable in the height of the rains, a month later, it behoved me to attempt it first, and it possessed the attraction of

leading to a frontier described as far to the northward of the snowy Himalaya, on a lofty plateau, whose plants and animals were different from anything I had previously seen.

After a week the coolies arrived with supplies: they had been delayed by the state of the paths, and had consequently consumed a part of my stock, reducing it to eight days' allowance. I therefore divided my party, leaving the greater number at Choongtam, with a small tent, and instructions to forward all food to me as it arrived. I started with about fifteen attendants, on the 25th of May, for Lam-teng, three marches up the Lachen.

Descending the step-formed terraces, I crossed the Lachen by a good cane bridge. The river is a head-strong torrent, and turbid from the vast amount of earthy matter which it bears along; and this character of extreme impetuosity, unbroken by any still bend, or even swirling pool, it maintains uninterruptedly at this season from 4000 to 10,000 feet. It is crossed three times by cane bridges, and I cannot conceive any valley of a similar nature to be more impracticable at such a season. On both sides the mountains rose, densely forest-clad, to 10,000 and 15,000 feet. Its extreme narrowness, and the grandeur of its scenery, were alike recalled to my mind, on visiting the Sachs valley in the Valais of Switzerland; from which, however, it differs in its luxuriant forest, and in the slopes being more uniform and less broken up into those imposing precipices so frequent in Switzerland.

At times we scrambled over rocks or descended into

gorges, through whose tributary torrents we waded ; or crossed swampy terraced flats of debris above the stream ; whilst it was sometimes necessary to round rocky promontories in the river, stemming the foaming torrent, as, one by one, we were dragged along by powerful Lepchas. Our halting-places were on flats close to the river, covered with large trees, and carpeted with a most luxuriant herbage, amongst which a wild buckwheat (*Polygonum*) was abundant, which formed an excellent spinach : it is called "Pullop-bi ;" a name I shall hereafter have occasion to mention with gratitude.

A few miles above Choongtam, we passed some cottages, but between this and Lamteng, the country is uninhabited, nor is it frequented during the rains. We consequently found that the paths had suffered, the little bridges and aids to climb precipices and cross landslips had been carried away, and at one place we were all but turned back. This was at the Taktoong river, a tributary on the east bank, which rushes down in a sheet of silvery foam, eighteen yards broad. It does not flow in a deep gulley, having apparently raised its bed by an accumulation of enormous boulders ; and a plank bridge was thrown across it, against whose slippery and narrow foot-boards the water dashed, loosening the supports on either bank, and rushing between their foundation-stones.

My unwilling guide had gone ahead with some of the coolies : I had suspected him all along (perhaps unjustly) of avoiding the most practicable routes ; but when I found him waiting for me at this bridge, to which he sarcastically pointed with his bow, I felt that

had he known of it, to have made difficulties before would have been a work of supererogation. He seemed to think I should certainly turn back, and assured me there was no other crossing (a statement I afterwards found to be untrue); so, comforting myself with the hope that if the danger were imminent, Meepo would forcibly stop me, I took off my shoes, and walked steadily over: the tremor of the planks was like that felt when standing on the paddle-box of a steamer, and I was jerked up and down, as my weight pressed them into the boiling flood, which shrouded me with spray. I looked neither to the right nor to the left, lest the motion of the swift waters should turn my head, but kept my eye on the white jets d'eau springing up between the woodwork, and felt thankful when fairly on the opposite bank: my loaded coolies followed, crossing one by one without fear or hesitation. The bridge was swept into the Lachen very shortly afterwards.

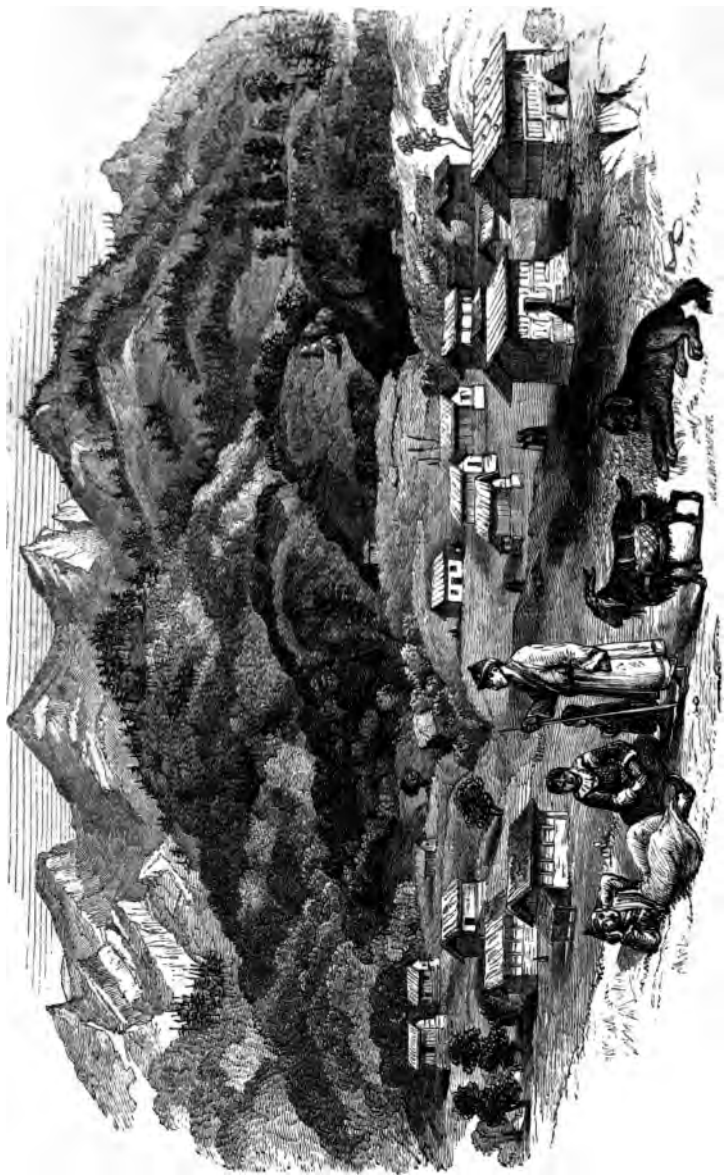
Towards Lamteng, the path left the river, and passed through a wood of *Abies Smithiana*. Larch appeared at 9000 feet, with *Abies Brunoniana*. An austere crab-apple, walnut, and the willow of Babylon (the two latter perhaps cultivated), yellow jessamine and ash, all scarce trees in Sikkim, were more or less abundant in the valley, at about 7000 feet; as was an ivy, very like the English, but with fewer and smaller yellow or reddish berries; and many other plants, not found at equal elevations on the outer ranges of the Himalaya.

Chateng, a spur from the lofty peak of Tukcham, rises 1000 feet above the west bank of the river; and where I crossed it commanded one of the finest alpine views



in Sikkim. It was grassy, strewn with huge boulders, and adorned with clumps of firs: on the summit was a small pool, beautifully fringed with bushy trees of white rose, a white-blossomed apple, a *Pyrus* like mountain-ash, scarlet rhododendrons, holly, and maples; there were also *Daphnes*, purple magnolia and a pink sweet-blossomed *Sphærostema*. Many English water-plants grew in the pond, but I found no shells; tadpoles, however swarmed, which later in the season become large frogs. The "painted-lady" butterfly and a pretty "blue" were flitting over the flowers, together with some great tropical kinds, that wander so far up these valleys, accompanying Marlea, the only sub-tropical tree that ascends to 8,500 feet in the interior of Sikkim.

Lamteng village, where I arrived on the 27th of May, is quite concealed by a moraine to the south, which, with a parallel ridge on the north, forms a beautiful bay in the mountains, 8,900 feet above the sea. The village stands on a grassy and bushy flat, around which the fir-clad mountains rise steeply to the black cliffs and snowy peaks which tower above. It contains above forty houses, forming the winter-quarters of the inhabitants of the valley, who, in summer, move with their flocks and herds to the alpine pastures of the Tibet frontier. The dwellings are like those described at Wallanchoon, but the elevation being lower, and the situation better sheltered, they are more scattered; whilst on account of the dampness of the climate, they are raised higher from the ground, and the shingles with which they are tiled decay in two or three years. Many are painted lilac, with the gables



LANTENG VILLAGE.

J. D. H. delt.



in diamonds of red, black, and white: the roofs are either of wood or bark, held down by large stones: within they are airy and comfortable. They are surrounded by a little cultivation of buck-wheat, radishes, turnips, and mustard. The inhabitants, though paying rent to the Sikkim Rajah, consider themselves as Tibetans, and are so in language, dress, features, and origin: they seldom descend to Choongtam, but yearly travel to the Tibetan towns of Jigatzi, Kambajong, Giantchi, and even to Lhassa, having commercial and pastoral transactions with the Tibetans, whose flocks are pastured on the Sikkim mountains during summer, and who trade with the plains of India through the medium of these villagers.

The snow having disappeared from elevations below 11,000 feet, the yaks, sheep, and ponies had just been driven 2000 feet up the valley, and the inhabitants were preparing to follow, with their tents and goats, to summer quarters at Tallum and Tungu. Many had goîtres and rheumatism, for the cure of which they flocked to my tent; dry-rubbing for the latter, and tincture of iodine for the former, gained me some credit as a doctor: I could, however, procure no food beyond trifling presents of eggs, meal, and more rarely, fowls.

On arriving I saw a troop of large monkeys gambolling in a wood of *Abies Brunoniana*; this surprised me, as I was not prepared to find so tropical an animal associated with a vegetation typical of a boreal climate. The only other quadrupeds seen here were some small earless rats, and musk-deer; the young female of which latter sometimes afforded me a dish of excellent venison;

being, though dark-coloured and lean, tender, sweet, and short-fibred. Birds were scarce, with the exception of alpine pigeons, red-legged crows, and the horned pheasant. The vegetation in the neighbourhood of Lamteng is European and North American; that is to say, it unites the boreal and temperate floras of the east and west hemispheres; presenting also a few features peculiar to Asia. This is a subject of very great importance in physical geography; as a country combining the botanical characters of several others, affords materials for tracing the direction in which genera and species have migrated, the causes that favour their migrations, and the laws that determine the types or forms of one region, which represent those of another. Sikkim is, geographically, peculiarly well situated for investigations of this kind, being centrally placed, whether as regards south-eastern Asia or the Himalayan chain. Again, the Lachen valley at this spot is nearly equi-distant from the tropical forests of the Terai and the sterile mountains of Tibet, for which reason representatives both of the dry Asiatic and Siberian, and of the humid Malayan floras meet there.

The mean temperature of Lamteng (about  $50^{\circ}$ ) is that of the isothermal which passes through Britain in lat.  $52^{\circ}$ , cutting the parallel of  $45^{\circ}$  in Siberia (due north of Lamteng itself), descending to lat.  $42^{\circ}$  on the east coast of Asia, ascending to lat.  $48^{\circ}$  on the west of America, and descending to that of New York in the United States. I shall take for comparison the flora of 7000 to 10,000 feet; of the mean temperature, namely, between  $53^{\circ}$  and  $43^{\circ}$ , the isothermal lines

corresponding to which embrace, at the level of the sea, a space varying from three to twelve degrees of latitude.\* At first it appears incredible that so limited an area should present nearly all the types of the flora of the north temperate zone ; not only, however, is this the case, but space is also found for the intercalation of types of a Malayan flora, otherwise wholly foreign to the north temperate region.

A few examples will show this. Amongst trees the Conifers are conspicuous at Lamteng, and all are of genera typical both of Europe and North America ; namely, silver fir, spruce, larch, juniper, and yew : there are also species of birch, alder, ash, apple, oak, willow, cherry, bird-cherry, mountain-ash, thorn, walnut, hazel, maple, poplar, ivy, holly, andromeda, rhamnus. Of bushes ; rose, berberry, bramble, rhododendron, elder, cornel, willow, honeysuckle, currant, &c. Herbaceous plants are far too numerous to be enumerated, as a list would include most of the common genera of European and North American plants.

Of North American genera, not found in Europe, were Buddleia, Magnolia, Sassafra, Hydrangea, Aralia, Panax, Trillium. The absence of heaths is also equally a feature in the flora of North America. The Japanese and Chinese floras are represented in Sikkim by Camellia, Deutzia, Aucuba, Hydrangea, Skimmia, and Enkianthus. The Malayan by Magnolias, vacciniums, rhododendrons, and many genera of orchids.

\* On the west coast of Europe, where the distance between these isothermal lines is greatest, this belt extends almost from Stockholm and the Shetlands to Paris.

Shortly after my arrival at Lamteng, the villagers sent to request that I would not shoot, as they said it brought on excessive rain, and consequent damage to the crops. My necessities did not admit of my complying with their wish unless I could procure food by other means ; and I at first paid no attention to their request. The people, however, became urgent, and the Choongtam Lama giving his high authority to the superstition, it appeared impolitic to resist their earnest supplication ; though I was well aware that the story was trumped up by the Lama for the purpose of forcing me to return. I yielded on the promise of provisions being supplied from the village, which was done to a limited extent ; and I was enabled to hold out till more arrived from Dorjiling, now, owing to the state of the roads, at the distance of twenty days' march. The people were always civil and kind : there was no concealing the fact that the orders were stringent, which prohibited my party being supplied with food, but many of the villagers sought opportunities by night of replenishing my stores. Superstitious and timorous, they regard a doctor with great veneration ; and when to that is added his power of writing, drawing, and painting, their admiration knows no bounds : they flocked round my tent all day, scratching their ears, lolling out their tongues, making a clucking noise, smiling, and timidly peeping over my shoulder, but flying in alarm when my little dog resented their familiarity by snapping at their legs. The men spend the whole day in loitering about, smoking, and spinning wool, while the women take the active duties ; a few

were engaged in drying the leaves of a shrub (*Symplocos*) for the Tibet market, which are used as a yellow dye; whilst, occasionally, a man might be seen cutting a spoon or a yak-saddle out of rhododendron wood.

During my stay at Lamteng, the weather was all but uniformly cloudy and misty, with drizzling rain, and a southerly, or up-valley wind, during the day, which changed to an easterly one at night: occasionally distant thunder was heard. My tent was constantly wet, nor did I once sleep in a dry bed till the 1st of June, which ushered in the month with a brilliant sunny day. At night it generally rained in torrents, and the roar of landslips and avalanches was then all but uninterrupted: sometimes it was a rumble, at others a harsh grating sound, and often accompanied with the crashing of immense timber-trees.

It was sometimes clear at sunrise, and I made many ascents of Tukcham, hoping for a view of the mountains towards the passes; but I was only successful on one occasion, when I saw the table top of Kinchinjhow, the most remarkable and one of the most distant peaks of dazzling snow which is seen from Dorjiling. I kept up a constant intercourse with Choongtam, sending my plants thither to be dried, and gradually reducing my party as our necessities urged me so doing; lastly, I sent back the shooters, who had procured very little, and whose occupation was now gone.

On the 2nd of June, I received the bad news that a large party of coolies had been sent from Dorjiling with rice, but that being unable or afraid to pass the landslips, they had returned: we had now no food



except a kid, a few handfuls of flour, and some potatoes, which had been sent from Choongtam. All my endeavours to gain information respecting the distance and position of the frontier were unavailing; the villagers calling all the lofty pastures a few marches beyond Lamteng "Bhote" or "Cheen" (Tibet). Dr. Campbell had procured for me information by which I might recognise the frontier were I once on it; but no description could enable me to find my way in a country so rugged and forest-clad, through tortuous and perpetually forking valleys, along often obliterated paths, and under cloud and rain. To these difficulties must be added the deception of the rulers, and the fact (of which I was not then aware), that the Tibet frontier was formerly at Choongtam; but from the Lepchas constantly harassing the Tibetans, the latter, after the establishment of the Chinese rule over their country, retreated first to Zemu Samdong, a few hours' walk above Lamteng, then to Tallum Samdong, 2000 feet higher; and, lastly, to Kongra Lama, 16,000 feet up the west flank of Kinchinjhow.

On the 3rd of June I took a small party, with my tent, and such provisions as I had, to explore up the river. On hearing of my intention, the Phipun volunteered to take me to the frontier, which he said was only two hours distant, at Zemu Samdong, where the Lachen receives the Zemu river from the westward: this I knew must be false, but I accepted his services, and we started, accompanied by a large body of villagers, who eagerly gathered plants for me along the road.

The scenery was very pretty; the path crossed extensive and dangerous landslips, or ran through fine woods of spruce and *Abies Brunoniana*, and afterwards along the river-banks, which were fringed with willow (called "Lama") and *Hippophae*. A great red rose, one of the most beautiful Himalayan plants, whose single flowers are as large as the palm of the hand, was blossoming, while golden *Potentillas* and purple primroses bordered the stream.

Just above the fork of the valley, a wooden bridge (Samdong) crosses the Zemu, which was pointed out to me as the frontier, and I was entreated to respect two sticks and a piece of worsted stretched across it; this I thought ridiculous, so as my followers halted on one side, I went on the bridge, threw the sticks into the stream, crossed, and asked the Phipun to follow; the people laughed, and came over: he then told me that he had authority to permit of my botanising there, but that I was in Cheen, and that he would show me the guard-house to prove the truth of his statement. He accordingly led me up a steep bank to an extensive flat, several hundred feet above the river, amid the jungle of which were several ruined stone houses, with thick walls pierced with loopholes: these had no doubt been occupied by Tibetans at the time when this was the frontier.

The elevation which I had attained (that of the river being 8,970 feet) being excellent for botanising, I camped; and the villagers, contented with the supposed success of their strategy, returned to Lamteng.

My guide from the Durbar had stayed behind at

Lamteng, and though Meepo and all my men well knew that this was not the frontier, they were ignorant as to its true position, nor could we even ascertain which of the rivers was the Lachen.\* The only routes I possessed indicated two paths northwards from Lamteng, neither crossing a river; and I therefore thought it best to remain at Zemu Samdong till provisions should arrive. I accordingly halted for three days, collecting many new and beautiful plants, and exploring the roads, of which five (paths or yak-tracks) diverged from this point, one on either bank of each river, and one leading up the fork.

On one occasion I ascended the steep hill at the fork; it was dry and rocky, and crowned with stunted firs. Stacks of different sorts of fir-wood were stored on the flat at its base, for export to Tibet, all thatched with bark. Of these the larch splits well, and is the most durable of any; but the planks are small, soft, and white.† The silver fir also splits well; it is white, soft, and highly prized for durability. The wood of *Abies Brunoniana* is like the others in appearance, but is not durable; its bark is however very useful. The spruce (*Abies Smithiana*) has also white wood, which is employed for posts and beams.‡ These are the only firs whose woods are considered very useful; and it is a curious circumstance that none produce any quantity of resin, turpentine, or pitch;

\* The eastern afterwards proved to be the Lachen.

† I never saw this wood to be red, close-grained, and hard, like that of the old Swiss larch; nor does it ever reach so great a size.

‡ These woods are all soft and loose in grain, compared with their European allies.

which may perhaps be accounted for by the humidity of the climate.

On the flat were flowering a beautiful magnolia with globular sweet-scented flowers like snow-balls, several balsams, honeysuckle, &c. On the hill-side were creeping brambles, lovely yellow, purple, pink, and white primroses, anemone, berberry, white rose, fritillary, &c.

Our guide had remained at Lamteng, on the plea of a sore on his leg from leech-bites: his real object, however, was to stop a party on their way to Tibet with madder and canes, who, had they continued their journey, would inevitably have pointed out the road to me. The villagers themselves now wanted to proceed to the pasturing-grounds on the frontier; so the Phipun sent me word that I might proceed as far as I liked up the east bank of the Zemu. I had explored the path, and finding it practicable, and likely to intersect a less frequented route to the frontier, I determined to follow it. A supply of food arrived from Dorjiling on the 5th of June, reduced, however, to one bag of rice, but with encouraging letters, and the assurance that more would follow at once. My men, of whom I had eight, behaved admirably, although our diet had for five days chiefly consisted of *Polygonum*, wild leeks, nettles, and *Procris* (an allied, and more succulent herb), eked out by eight pounds of Tibet meal which I had bought for ten shillings by stealth from the villagers.

From Zemu Samdong the valley turns north-west to the junction of the Zemu with the Thlonok, which rises

on the north-east flank of Kinchinjunga: at this place I halted for several days, while building a bridge over the Thlonok. The path runs first through a small forest of birch, alder, and maple, on the latter of which I found *Balanophora* growing abundantly: this species produces the great knots on the maple roots, from which the Tibetans form the cups mentioned by MM. Huc and Gabet. I was so fortunate as to find a small store of these knots, cleaned, and cut ready for the turner, and hidden behind a stone by some poor Tibetan: they had evidently been there a very long time.

In the ravines there were enormous accumulations of ice, the result of avalanches; one of them crossed the river, forming a bridge thirty feet thick, at an elevation of only 9,800 feet above the sea. In the fir-woods a large mushroom was abundant, which also forms a favourite article of food. Another pot-herb (to which I was afterwards more indebted than any) was a beautiful *Smilacina*, which grows from two to five feet high, and has plaited leaves and crowded panicles of white bell-shaped flowers, like those of its ally the lily of the valley, which it also resembles in its mucilaginous properties. It is called "Chokli-bi," and its young flower-heads, sheathed in tender green leaves, form an excellent vegetable. Nor must I forget to include amongst the eatable plants of this hungry country, young shoots of the mountain bamboo, which are good either raw or boiled, and may be obtained up to 12,000 feet in this valley. At 10,000 feet silver-fir commenced, with a close undergrowth of a small twiggy

holly. This, and the dense thicket of rhododendron\* on the banks of the river and edges of the wood, rendered the march very fatiguing, and swarms of midges kept up a tormenting irritation.

The Zemu continued an impetuous muddy torrent, whose hoarse voice, mingled with the deep grumbling noise of the boulders rolling along its bed, was my lullaby for many nights. At its junction with the Thlonok, it comes down a steep gulley from the north, foreshortened into a cataract 1000 feet high, and appearing the smaller stream of the two; whilst the Thlonok winds down from the snowy face of Kinchinjunga, whose summit is seen up the valley, about twenty miles distant. All around are lofty and rocky mountains, sparingly wooded with pines and larch, chiefly on their south flanks, which receive the warm, moist, up-valley winds; the faces exposed to the north being colder and more barren: exactly the reverse of what is the case at Choongtam, where the rocky and sunny south-exposed flanks are the driest.

My tent was pitched on a broad terrace, opposite the junction of the Zemu and Thlonok; it was sheltered by some enormous transported blocks fifteen feet high, and surrounded by a luxuriant vegetation of most beautiful rhododendrons in full flower, willow, white rose, white-flowered cherry, thorn, maple and birch. Some great tuberous-rooted arums were very abundant; and the ground was covered with small pits, in which were large wooden pestles: these are used in the preparation of food from the arums, to which the miser-

\* Of which I had already gathered thirteen kinds in this valley.

able inhabitants of the valley have recourse in spring, when their yaks are calving. The roots are bruised with the pestles, and thrown into these holes with water. Acetous fermentation commences in seven or eight days, which is a sign that the acrid poisonous principle is dissipated: the pulpy, sour, and fibrous mass is then boiled and eaten; its nutriment being the starch, which exists in small quantities, and which they have not the skill to separate by grating and washing. This preparation only keeps a few days, and produces bowel complaints, and loss of the skin and hair, especially when insufficiently fermented. Besides this, the "chokli-bi," and many other esculents, abounded here; and we had great need of them before leaving this wild uninhabited region.

I repeatedly ascended the north flank of Tukcham along a watercourse, by the side of which were immense slips of rocks and snow-beds; the mountain-side being excessively steep. My object was chiefly to obtain views and compass-bearings, in which I was generally disappointed: once only I had a magnificent prospect of Kinchinjunga, sweeping down in one unbroken mass of glacier and ice, fully 14,000 feet high, to the head of the Thlonok river, whose upper valley appeared a broad bay of ice; being doubtless one of the largest glaciers in the Himalaya. The south side of the Thlonok valley is formed by a range from Kinchinjunga, running east to Tukcham, where it terminates: from it rises the beautiful mountain Liklo, 22,582 feet high, which, from Dorjiling, appears as a sharp peak, but is here seen to be a jagged crest running north and south.

I made two futile attempts to ascend the Thlonok river to the great glaciers at the foot of Kinchinjunga, following the south bank, and hoping to find a crossing-place, and so to proceed north to Tibet. The fall of the river is not great at this part of its course, nor up to 12,000 feet, which was the greatest height I could attain, and about eight miles beyond my tents; above that point, at the base of Liklo, the bed of the valley widens, and the rhododendron shrubbery was quite impervious, while the sides of the mountain were inaccessible. We crossed extensive snow-beds, by cutting holes in their steep faces, and rounded rocks in the bed of the torrent, dragging one another through the violent current, whose temperature was below 40°.

On these occasions, the energy of the Lepchas was quite remarkable, and they were as keenly anxious to reach the holy country of Tibet as I could possibly be. It was sometimes dark before we got back to our tents, tired, with torn clothes and cut feet and hands, returning to a miserable dinner of boiled herbs; but never did any of them complain, or express a wish to leave me. In the evenings and mornings they were always busy, changing my plants, and drying the papers over a sulky fire at my tent-door; and at night they slept, each wrapt in his own blanket, huddled together under a rock, with another blanket thrown over them all. Provisions reached us so seldom, and so reduced in quantity, that I could never allow more than one pound of rice to each man in a day, and frequently during this trying month they had not even that; and I eked out our meagre supply with a few



ounces of preserved meats, occasionally "splicing the main brace" with weak rum-and-water.

At the highest point of the valley which I reached, water boiled at 191·3, indicating an elevation of 11,903 feet: here the temperature at 1 P.M. was nearly 70°. After boiling my thermometer on these occasions, I generally made a little tea for the party; a refreshment to which they looked forward with child-like eagerness. The fairness with which these good-hearted people used to divide the scanty allowance, and afterwards the leaves, which are greatly relished, was an engaging trait in their simple character: I have still vividly before me their sleek swarthy faces and twinkling Tartar eyes, as they lay stretched on the ground in the sun, or crouched in the sleet and snow beneath some sheltering rock; each with his little polished wooden cup of tea, watching my notes and instruments with curious wonder, asking, "How high are we?" "How cold is it?" and comparing the results with those of other stations, with much interest and intelligence.

On the 11th June, my active people completed a most ingenious bridge of branches of trees, bound by withes of willow; by which I crossed to the north bank, where I camped on an immense flat terrace at the junction of the rivers, and about fifty feet above their bed.

Our first discovery, after crossing, was of a good bridge across the Zemu, above its junction, and of a path leading down to Zemu Samdong; this was, however, scarcely traceable up either stream. My men were better housed here in sheds; and I made several more ineffectual attempts to ascend the valley to the

glaciers. The path, gradually vanishing, ran alternately through fir-woods, and over open grassy spots, covered with vegetation, amongst which the gigantic arum was plentiful, whose roots seemed to be the only attraction in this wet and miserable valley.

On my return one day, I found my people in great alarm, the Phipun having sent word that we were on the Tibet side of the rivers, and that Tibetan troops were coming to plunder my goods, and carry my men into slavery. I assured them he only wanted to frighten them; that the Cheen soldiers were civil orderly people; and that as long as Meepo was with us, there was no cause for fear. Fortunately a young musk-deer soon afterwards broke cover close to the tent, and its flesh wonderfully restored their courage: still I was constantly harassed by threats; some of my people were suffering from cold and bowel complaints, and I from rheumatism; while one fine lad, who came from Dorjiling, was delirious with a violent fever, contracted in the lower valleys, which sadly dispirited my party.

Having been successful in finding a path, I took my tent and a few active lads up the Zemu, camping on a high rock above the forest region, hoping thence to penetrate northwards. I left my collections in the interim at the junction of the rivers, where the sheds and an abundance of firewood were great advantages for preserving the specimens. I repeatedly followed the river for several miles, but though its valley widened, the rhododendron thickets below, and the cliffs above, defeated all endeavours to reach the drier climate beyond, of which I had abundant evidence in

the arch of brilliant blue that spanned the heavens to the north, beyond a black canopy of clouds that hid everything around, and poured down rain without one day's intermission, during the eight which I spent here.



BLACK JUNIPER (height sixty feet) AND YOUNG LARCH.

## CHAPTER XX.

Camp on Zemu river—Scenery—Falling rocks—Tukcham mountain—Height of glaciers—Botany—Gigantic rhubarb—Storm—Temperature of rivers—Behaviour of Lachen Phipun—Hostile conduct of Bhotas—View from mountains above camp—Descend to Zemu Samdong—Vegetation—Letters from Dorjiling—Arrival of Singtam Soubah—Presents from Rajah—Parties collecting Arum-roots—Insects—Ascend Lachen river—Tallum Samdong village—Cottages—Mountains—Plants—Entomology—Weather—Conduct of Singtam Soubah—His character and illness—Agrees to take me to Kongra Lama—Tungu—Appearance of country—Houses—Poisoning by Arum-roots—Yaks and calves—Tibet ponies—Journey to Kongra Lama—Tibetan tents—Butter, curds, and churns—Hospitality—Kinchinjhow and Chomiomo—Magnificent scenery—Reach Kongra Lama Pass.

My little tent was pitched in a commanding situation, on a rock fifty feet above the Zemu, overlooking the course of that river to its junction with the Thlonok. The descent of the Zemu in one thousand feet is more precipitous than that of any other river of its size with which I am acquainted in Sikkim, yet immediately above my camp it was more tranquil than at any part of its course onwards to the plains of India, whether as the Zemu, Lachen, or Teesta. On the west bank a fine mountain rose in steep ridges and shrubby banks to 15,000 feet; on the east a rugged cliff towered above the stream, and from this (owing to the melting of the snow, and consequent disintegration of the blocks) huge masses

were ever and anon precipitated into the torrent, with a roar that repeatedly spread consternation amongst us. During rains especially, and at night, when the chilled atmospheric currents of air descended, and the sound was not dissipated as in the day-time, the noise of these falls was sufficiently alarming. My tent was pitched near the base of the cliff, and so high above the river, that I had thought it beyond the reach of danger; but one morning I found that a large fragment of granite had been hurled during the night to my very door, my dog having had a most narrow escape. I have seen few finer sights than the fall of these stupendous blocks into the furious torrent, along which they were carried amid feathery foam for many yards before settling.

Across the Thlonok to the southwards, rose the magnificent mountain of Tukcham, but I only once caught a glimpse of its summit, which even then clouded over before I could get my instruments adjusted for ascertaining its height. Its top is a sharp cone, surrounded by rocky shoulders, that rise from a mass of snow.

Glaciers in the north-west Himalaya descend to 11,000 feet; but I could not discover any in these valleys even so low as 14,000 feet, though at this season extensive snow-beds remain unmelted at but little above 10,000 feet. The foot of the stupendous glacier filling the broad head of the Thlonok is certainly not below 14,000 feet; though being continuous with the perpetual snow (or *névé*) of the summit of Kinchinjunga, it must have 14,000 feet of ice, in perpendicular height, to urge it forwards.

All my attempts to advance up the Zemu were fruitless, and a snow bridge by which I had hoped to cross to the opposite bank was carried away by the daily swelling river, while the continued bad weather prevented any excursions for days together. Botany was my only resource, and as vegetation was advancing rapidly under the influence of the southerly winds, I made a rich harvest: for though some of the finest Himalayan plants flower later, June is still the most glorious month for show.

Rhododendrons occupied the most prominent place, clothing the mountain slopes with a deep green mantle glowing with bells of brilliant colours; of the eight or ten species growing here, every bush was loaded with as great a profusion of blossoms as are their northern congeners in our English gardens. Primroses were next, both in beauty and abundance; and they were accompanied by yellow cowslips, three feet high, purple polyanthus, and pink large-flowered dwarf kinds nestling in the rocks, and an exquisitely beautiful blue miniature species, whose blossoms sparkled like sapphires on the turf. Gentians began to unfold their deep azure bells, aconites to rear their tall blue spikes, and fritillaries to burst into flower. On the black rocks the gigantic rhubarb formed pale pyramidal towers a yard high, of inflated reflexed bracts, that conceal the flowers, and over-lapping one another like tiles, protect them from the wind and rain; a whorl of broad green leaves edged with red spreads on the ground at the base of the plant, contrasting in colour with the transparent bracts, which are yellow, margined with

pink. This is the handsomest herbaceous plant in Sikkim: it is called "Tchuka," and the acid stems are eaten both raw and boiled; they are hollow and full of pure water: the root resembles that of the medicinal rhubarb, but it is spongy and inert; it attains a length of four feet, and grows as thick as the arm. The dried leaves afford a substitute for tobacco; a smaller kind of rhubarb is, however, more commonly used in Tibet for this purpose.

The last days of June (as is often the case) were marked by violent storms, and for two days my tent proved no protection; similar weather prevailed all over India, the barometer falling very low. Snow fell abundantly as low as 13,000 feet, and the rivers were much swollen, the size and number of the stones they rolled along producing a deafening turmoil. The wind was southerly, very raw and cold, and drizzling rain constantly fell.

The temperature of these rivers varies extremely at different parts of their course, depending on that of their affluents. The Teesta is always cool in summer (where its bed is below 2000 feet), its temperature being 20° below that of the air; whereas in mid-winter, when there is less cloud, and the snows are not melting, it is only a few degrees colder than the air. At this season, in descending from 12,000 to 1000 feet, its temperature does not rise 10°, though that of the air rises 30° or 40°. It is a curious fact, that the temperature of the northern feeders of the Teesta, in some parts of their course, rises with the increasing elevation! Of this the Zemu afforded a conspicuous

example : during my stay at its junction with the Thlonok it was  $40^{\circ}$ , or  $6^{\circ}$  warmer than that river ; at 1,100 feet higher it was  $48^{\circ}$ , and at 1,100 feet higher still it was  $49^{\circ}$  ! These observations were repeated in different weeks, and several times on the same day, both in ascending and descending, and always with the same result : they told, as certainly as if I had followed the river to its source, that it rose in a drier and comparatively sunny climate, and flowed amongst little snowed mountains.

Meanwhile, the Lachen Phipun continued to threaten us, and I had to send back some of the more timorous of my party. On the 28th of June fifty men arrived at the Thlonok, and turned my people out of the shed at the junction of the rivers, together with the plants they were preserving, my paste-boards, papers, and utensils. The Lepchas came to me breathless, saying that there were Tibetan soldiers amongst them, who declared that I was in Cheen, and that they were coming on the following morning to drive me back to Dorjiling. I had little fear for myself, but was anxious with respect to my collections ; it was getting late in the day, and raining, and I had no mind to go down and expose myself to the first brunt of their insolence, which I felt sure a night of such weather would materially wash away. Meepo was too frightened, but Nimbo, my Bhotan coolie Sirdar, volunteered to go, with two stout fellows ; and he accordingly brought away my plants and papers, having held a parley with the enemy, who, as I suspected, were not Tibetans. The best news he brought was, that they were half-clad and



without food; the worst, that they swaggered and bullied: he added, with some pride, that he gave them as good as he got, which I could readily believe, Nimbo being really a resolute fellow, and moreover accomplished in Tibet slang.

On the following morning it rained harder than ever, and the wind was piercingly cold. My timid Lepchas huddled behind my tent, which, from its position, was only to be stormed in front. I dismantled my little observatory, and packed up the instruments, tied my dog, Kinchin, to one of the tent-pegs, placed a line of stones opposite the door, and seated myself on my bed on the ground, with my gun beside me.

The dog gave tongue as twenty or thirty people defiled up the glen, and gathered in front of my tent; they were ragged Bhoteas, with bare heads and legs, in scanty woollen garments sodden with rain, which streamed off their shaggy hair, and furrowed their sooty faces; their whole appearance recalled to my mind Dugald Dalgetty's friends, the children of the mist.

They appeared nonplussed at seeing no one with me, and at my paying no attention to them, whilst the valiant Kinchin effectually scared them from the tent-door. When they requested a parley, I sent the interpreter to say that I would receive three men, and that only provided all the rest were sent away immediately; this, as I anticipated, was acceded to at once, and there remained only the Lachen Phipun and his brother. Without waiting to let him speak, I rated him soundly, saying, that I was ready to leave the

spot when he could produce any proof of my being in Bhote (or Tibet), which he knew well I was not; that, since my arrival at Lachen, he had told me nothing but lies, and had contravened every order, both of the Rajah and of Tchebu Lama. I added, that I had given him and his people kindness and medicine, their return was bad, and he must go about his business at once, having, as I knew, no food, and I having none for him. He behaved very humbly, and finally took himself off much discomfited, and two days afterwards sent men to assist me in moving my things.

The 1st of July was such a day as I had long waited for to obtain a view, and I ascended the mountain west of my camp, to an elevation of 14,914 feet.

Drizzling mist, which had shrouded Tukcham all the morning, prevented any prospect from the highest point reached; but on the ascent I had an excellent view up the Zemu, which opened into a broad grassy valley, where I saw with the glass some wooden sheds, but no cattle or people. To reach these, however, involved crossing the river, which was now impossible; and I reluctantly made up my mind to return on the morrow to Zemu Samdong, and thence try the other river.

On my descent to the Thlonok, I found that the herbaceous plants on the terraces had grown fully two feet during the fortnight, and now presented almost a tropical luxuriance and beauty. At Zemu Samdong I found the vegetation even more gay and beautiful: the gigantic lily was in full flower, and scenting the air, with a lovely red rose. Neillia also was blossoming

profusely at my old camping-ground, to which I now returned after a month's absence.

Soon after my arrival I received letters from Dr. Campbell, who had strongly and repeatedly represented to the Rajah his opinion of the treatment I was receiving; and this finally brought an explicit answer, to the effect that his highness' orders had been full and peremptory that I should be supplied with provisions, and safely conducted to the frontier. With these came letters on the Rajah's part from Tchebu Lama to the Lachen Phipun, ordering him to take me to the pass, but not specifying its position; fortunately, however, Dr. Campbell sent me a route, which stated the pass to be at Kongra Lama, several marches beyond this, and in the barren country of Tibet.

On the 5th of July the Singtam Soubah arrived: he was charged to take me to the frontier, and brought letters from the Rajah and a handsome present, consisting of Tibet cloth, and a dress of China silk brocaded with gold; the Ranee also sent me a basket of Lhassa sweetmeats, consisting of Sultana raisins from Bokhara, sliced and dried apricots from Lhassa, and Diospyros fruit from China. The Soubah wanted to hurry me to the frontier and back at once, being no doubt instigated to do so by the Dewan, and by his having no desire to spend much time in the dreary regions I wanted to explore. I positively refused, however, to start until more supplies arrived, unless he used his influence to provide me with food; and as he insisted that the frontier was at Tallum Samdong, only one march up the Lachen, I foresaw that this

move was to be but one step forward, though in the right direction. He went forward to Tallum at once, leaving me to follow.

The Lamteng people had all migrated beyond that point to Tungu, where they were pasturing their cattle: I sent thither for food, and procured a little meal at a very high price, a few fowls and eggs; the messenger brought back word that Tungu was in Tibet, and that the villagers ignored Kongra Lama. A large piece of yak-flesh being brought for sale, I purchased it; but it proved the toughest meat I ever ate, being no doubt that of an animal that had succumbed to the arduous duties of a salt-carrier over the passes: at this season, however, when the calves are not a month old, it was in vain to expect better.

Large parties of women and children were daily passing my tent, on their way from Tungu, to collect arum-roots at the Thlonok, all with baskets at their backs, down to rosy urchins of six years old; they returned after several days, their baskets neatly lined with rhododendron leaves, and full of a nauseous-looking yellow acid pulp, which told forcibly of their extreme poverty. The children were very fair; indeed the young Tibetan is as fair as an English brunette, before his perennial coat of smoke and dirt has stained his face, and it has become bronzed and wrinkled by the scorching sun and rigorous climate of these inhospitable countries. Children and women were alike decked with roses, and all were good-humoured and pleasant, behaving with great kindness to one another, and unaffected politeness to me.

During my ten days' stay at Zemu Samdong, I formed a large collection of insects, which was in great part destroyed by damp: many were new, beautiful, and particularly interesting, from belonging to types whose geographical distribution is analogous to that of the vegetation. The caterpillar of the swallow-tail butterfly was common, feeding on umbelliferous plants, as in England; and that of a *Sphinx* was devouring the euphorbias; the English "painted-lady" was common, as were "sulphurs," "marbles," "whites," "blues," and *Thecla*, of British aspect but foreign species. Amongst these, tropical forms were rare, except one fine black swallow-tail. Beetles were most rare, and (what is remarkable) the wood-borers particularly so. A large *Telephora* was very common, and had the usual propensity of its congeners for blood; lamellicorn beetles were also abundant.

On the 11th of July five coolies arrived with rice: they had been twenty days on the road, and had been obliged to make great detours, the valley being in many places impassable. They brought me a parcel of English letters; and I started up the Lachen on the following day, with renewed hopes and high spirits. The road first crossed the Zemu and the spur beyond, and then ascended the west bank of the Lachen, a furious torrent for five or six miles, during which it descends 1000 feet, in a chasm from which rise lofty black pine-clad crags, topped by snowy mountains, 15,000 feet high.

Above 11,000 feet the valley expands remarkably, the mountains recede, become less wooded, and more

grassy, while the stream is suddenly less rapid, meandering in a broader bed, and bordered by marshes, covered with sedges, dwarf Tamarisk, and many kinds of yellow and red *Pedicularis*. There are far fewer rhododendrons here than in the damper Zemu valley at equal elevations, and more Siberian, or dry country types of vegetation.\* The Singtam Soubah and Lachen Phipun received me at the bridge at Tallum, and led me across the river (into Tibet they affirmed) to a pretty green sward, near some gigantic boulders, where I camped.

The village of Tallum consisted of a few wretched stone huts, placed in a broad part of the valley, which is swampy, and crossed by several ancient moraines, which descend from the gullies on the east flank. The cottages were from four to six feet high, without windows, and consisted of a single apartment, in which the inmates were huddled together amid smoke, filth, and darkness: it contained neither table, chair, nor stool; their beds were merely a plank, and their only utensils a bamboo churn, copper, bamboo and earthenware vessels for milk, butter, &c.

Grassy or stony mountains slope upwards from

\* The following common English wild and garden plants grow here. *Umbelliferae*, with sage, *Ranunculus*, *Anemone*, Aconites, Gentians, *Panax*, *Euphrasia*, speedwell, *Prunella vulgaris*, thistles, bistort, *Parnassia*, purple orchis, *Prenanthes*, and *Lactuca*. The woody plants of this region are willows, birch, *Cotoneaster*, maple, three species of *Viburnum*, three of *Spiræa*, *Vaccinium*, *Aralia*, *Deutzia*, *Philadelphus*, rhododendrons, two junipers, silver fir, larch, three honeysuckles, *Neillia*, and a *Pieris*, whose white blossoms are so full of honey as to be sweet and palatable.

these flats to 15,000 feet, but no snow is visible, except on Kinchinjhow and Chomiomo, about fifteen miles up the valley. Both these are flat-topped, and dazzlingly white, rising into peaks, and precipitous on all sides; they are grand, bold, isolated masses, quite unlike the ordinary snowy mountains in form, and far more imposing even than Kinchinjunga, though not above 22,000 feet in elevation.

Herbaceous plants are much more numerous here than in any other part of Sikkim; and sitting at my tent-door, I could gather forty-three species,\* of which all but two belonged to English genera. In the rich soil about the cottages were crops of dock, shepherd's-purse, balsams, nettle, mustard, radish, turnip, &c. On the neighbouring hills I found many fine plants, partaking more or less of the Siberian type. Altogether I gathered upwards of 200 species, nearly all belonging to North European genera. Twenty-five were woody shrubs, and six were ferns; sedges were in great profusion, amongst them three of British kinds; seven or eight were orchids, including a beautiful lady's-slipper.

The entomology of Tallum, like its botany, was Siberian, Arctic types occurring at lower elevations than in the wetter parts of Sikkim. Of beetles the honey-feeding ones prevailed, with European forms of

\* In England thirty is, on the average, the number of plants, which in favourable localities I have gathered in an equal space. In both cases many are seedlings of short-lived annuals, and in neither is the number a test of the luxuriance of the vegetation; it but shows the power which the different species exert in their struggle to obtain a place.

others that inhabit yak-droppings. Bees were common, but there were no wasps, and but few ants. Grasshoppers were rare; *Tipula* was common, with a small sand-fly; but there were neither leeches, mosquitos, ticks, nor midges. Pigeons, red-legged crows, and hawks were the common birds; with a few waders in the marshes.

Being now fairly behind most of the great rain-collecting mountains, I experienced a considerable change in the climate; very little rain fell, and that chiefly drizzle; but this was so constant that the weather felt chilly and comfortless, and I never returned dry from botanising. The early mornings were bright, with views northwards of blue sky and Kinchinhow, while to the south the lofty peak of Tukcham, though much nearer, was seldom seen, and black clouds rolled up the steep valley of the Lachen to be dissipated in mist over Tallum.

These streams are not marked by the diurnal rise and fall, so characteristic of the Swiss rivers and those of the western Himalaya, where a powerful sun melts the glaciers by day, and their head-streams are frozen by night. Here the clouds prevent alike solar and nocturnal radiation, the temperature is more uniform, and the corroding power of the damp southerly wind that blows strongly throughout the day is the great melting agent.

The Singtam Soubah visited me daily, and we held long friendly conversations: he still insisted that the Yangchoo (the name he gave to the Lachen at this place) was the boundary, and that I must not go any



further. His first question was always "How long do you intend to remain here? have you not got all the plants and stones you want? you can see the sun much better with those brasses and glasses (alluding to the sextant, &c.) lower down; it is very cold here, and there is no food:"—to all which I had but one reply, that I should not return till I had visited Kongra Lama. He was, I think, at heart good-natured; I had no difficulty in drawing him on to talk about Tibet, and the holy city of Teshoo Loombo, with its gilt temples, and convents, its holiest of all the holy grand Lamas of Tibet, and all the wide Boodhist world besides. Had it even been politic, I felt that it would be unfair to be angry with a man who was evidently in a false position between myself and his two rulers, the Rajah and Dewan; who had a wife and family on the smiling flanks of Singtam, and who longed to be soaking in the warm rain of Sikkim, drinking Murwa beer (a luxury unknown among these Tibetans) and gathering in his crops of rice, millet, and buckwheat. Though I may owe him a grudge for his subsequent violence, I still recal with pleasure the hours we spent together on the banks of the Lachen. In all matters respecting the frontier, his lies were circumstantial; and he further took the trouble of bringing country people to swear that this was Cheen, and that there was no such place as Kongra Lama. I had written to ask Dr. Campbell for a definite letter from Tchebu Lama on this point, but unfortunately my despatches were lost; the messenger who conveyed them missed his footing in crossing the Lachen, and narrowly

escaped with life, while the turban in which the letters were placed was carried down the current.

Finally the Soubah tried to persuade my people that one so incorrigibly obstinate must be mad, and that they had better leave me. One day, after we had had a long discussion about the geography of the frontier, he inflamed my curiosity by telling me that Kinchinhow was a very holy mountain; more so than its sister-peaks of Chumulari and Kinchinjunga; and that both the Sikkim and Tibetan Lamas, and Chinese soldiers, were ready to oppose my approach to it. This led to my asking him for a sketch of the mountains; he called for a sheet of paper, and some charcoal, and wanted to form his mountains of sand; I however ordered rice to be brought, and though we had but little, scattered it about wastefully. This had its effect; he stared at my wealth, for he had calculated on starving me out, and retired, looking perplexed and crestfallen. Nothing puzzled him so much as my being always occupied with such, to him, unintelligible pursuits; a Tibetan "cui bono?" was always in his mouth: "What good will it do *you*?" "Why should you spend weeks on the coldest, hungriest, windiest, loftiest place on the earth, without even inhabitants?" Drugs and idle curiosity he believed were my motives, and possibly a reverence for the religion of Boodh, Sakya, and Tsongkaba. Latterly he had made up his mind to starve me out, and was dismayed when he found I could hold out better than himself, and when I assured him that I should not retrace my steps until his statements should be verified by a letter

from Tchebu; that I had written to him, and that it would be at least thirty days before I could receive an answer.

On the 19th of July he proposed to take me to Tungu, at the foot of Kinchinjhow, and back, upon ponies, provided I would leave my people and tent, which I refused to do. After this I saw little of him for several days, and began to fear he was offended, when one morning his attendant came to me for medicine with a dismal countenance, and in great alarm; he twisted his fingers together over his stomach to symbolise the nature of the malady which produced a commotion in his master's bowels, and which was simply the colic. I was aware that he had been reduced to feed upon "Tong" (the arum-root) and herbs, and had always given him half the pigeons I shot, which was almost the only animal food I had myself. Now I sent him a powerful dose of medicine; adding a few spoonfuls of China tea and sugar for friendship.

On the 22nd, being convalescent, he visited me, looking wofully yellow. After a long pause, he offered to take me to Tungu with my tent and people, and thence to Kongra Lama, if I would promise to stay but two nights. I asked whether Tungu was in Cheen or Sikkim; he replied that after great enquiry he had heard that it was really in Sikkim; "Then," said I, "we will go to-morrow morning to Tungu, and I will stay there as long as I please:" he laughed, and gave in with apparent good grace.

After leaving Tallum, the valley contracts, passing



TUNGU VILLAGE.

over great ancient moraines, and again expanding wider than before into broad grassy flats. The vegetation rapidly diminishes in stature and abundance, and though the ascent to Tungu is trifling, the change in species is very great.

Tungu occupies a very broad grassy valley, from which the hills slope gently upwards to 16,000 feet; no snow is anywhere to be seen.\* A stupendous rock, about fifty feet high, lay in the middle of the valley, broken in two: it may have been detached from a cliff, or have been transported thither as part of an ancient moraine which extends from the mouth of the Tungu-choo valley across that of the Lachen. The appearance and position of this great block, and of the smaller piece lying beside it, rather suggest the idea of the whole mass having fallen perpendicularly from a great height through a *crevasse* in a glacier than of its having been hurled from so considerable a distance as from the cliffs on the flanks of the valley: it is faithfully represented in the accompanying woodcut. A few wooden houses were collected near this rock, and several black tents were scattered about. I encamped at an elevation of 12,750 feet, and was waited on by the Lachen Phipun with presents of milk, butter, yak-flesh, and curds; and we were not long before we drowned old enmity in buttered and salted tea.

On my arrival I found the villagers in a meadow, all squatted cross-legged in a circle, smoking their brass

\* In the woodcut the summit of Chomiomo is introduced, as it appears from a few hundred feet above the point of view.

and iron pipes, drinking tea, and listening to a letter from the Rajah, concerning their treatment of me. Whilst my men were pitching my tent, I gathered forty plants new to me, all of Tartarian types. Wheat or barley I was assured had been cultivated at Tungu when it was possessed by Tibetans, and inhabited by a frontier guard; but I saw no appearance of any cultivation. The fact is an important one, as barley requires a mean summer temperature of  $48^{\circ}$  to come to maturity. According to my observations, the mean temperature of Tungu in July is upwards of  $50^{\circ}$ , and, by calculation, that of the three summer months, June, July, and August, should be about  $46\frac{1}{2}^{\circ}$ . As, however, I do not know whether these cerealia were grown as productive crops, much stress cannot be laid upon the fact of their having been cultivated, for in many parts of Tibet the barley is cut green for fodder.

In the evening the sick came to me; their complaints, as usual, being rheumatism, ophthalmia, goîtres, cuts, bruises, and poisoning by Tong, fungi, and other deleterious vegetables. At Tallum I attended an old woman who dressed her ulcers with plantain leaves, a very common Scotch remedy; the ribs being drawn out from the leaf, which is applied fresh: it is rather a strong application.

On the following morning I was awakened by the shrill cries of the Tibetan maidens, calling the yaks to be milked, "Toosh—toosh—toooosh," in a gradually higher key; to which Toosh seemed supremely indifferent, till quickened in her movements by a stone or stick, levelled with unerring aim at her ribs; these

animals were changing their long winter's wool for sleek hair, and the former hung about them in ragged masses, like tow. Their calves gambolled by their sides, the drollest of animals, kicking up their short hind-legs, whisking their bushy tails in the air, rushing up and down the grassy slopes, and climbing like cats to the top of the rocks.

The Soubah and Phipun came early to take me to Kongra Lama, bringing ponies, genuine Tartars in bone and breed. Remembering the Dewan's impracticable saddle at Bhomsong, I stipulated for a horse-cloth or pad, upon which I had no sooner jumped than the beast threw back his ears, seated himself on his haunches, and, to my consternation, slid backwards down a turfy slope, pawing the earth as he went, and leaving me on the ground, amid shrieks of laughter from my Lepchas. My steed being caught, I again mounted, when he took to shaking himself like a dog till the pad slipped under his belly, and I was again unhorsed. Other ponies displayed equal prejudices against my mode of riding, or having my weight anywhere but well on their shoulders, being all powerful in their fore-quarters; so I was compelled to adopt the high demi-pique saddle with short stirrups, which forced me to sit with my knees up to my nose, and to grip with the calves of my legs and heels. All the gear was of yak or horse hair, and the bit was a curb and ring, or a powerful twisted snaffle.

About six miles above Tungu, the Lachen meanders along a broad stony bed, and the path rises over a great ancient moraine, whose level top is covered with pools,

but both that and its south face are bare, from exposure to the south wind, which blows with fury through this contracted part of the valley to the rarified atmosphere of the lofty, open, and dry country beyond. Its north slope, on the contrary, is covered with small trees and brushwood, of rhododendron, birch, honeysuckle, and mountain-ash. These are the most northern shrubs in Sikkim, and I regarded them with deep interest, as being possibly the last of their kind to be met with in this meridian, for many degrees further north : perhaps even no similar shrubs occur between this and the Siberian Altai, a distance of 1,500 miles.

At the foot of the moraine was a Tibetan camp of black yak-hair tents, looking at a distance—(to borrow M. Huc's graphic simile)—like fat-bodied, long-legged spiders ! Their general shape was hexagonal ; they were about twelve feet in diameter, and were stretched over six short posts, and encircled with a low stone wall, except in front. In one of them I found a buxom girl, the image of good humour, making butter and curd from yak-milk. The churns were of two kinds ; one being an oblong box of birch-bark, or close bamboo wicker-work, full of branched rhododendron twigs, in which the cream was shaken : she good-naturedly showed me the inside, which was frosted with snow-white butter, and alive with maggots. The other churn was a goat-skin, which was rolled about, and shaken by the four legs. The butter is made into great squares, and packed in yak-hair cloths ; the curd is eaten either fresh, or dried and pulverised.



Except bamboo and copper milk-vessels, wooden ladles, tea-churn, and pots, these tents contained no furniture but goat-skins and blankets, to spread on the ground as a bed. The fire was made of sheep and goats'-droppings, lighted with juniper-wood; above it hung tufts of yaks'-hair, one for every animal lost during the season, by which means a reckoning is kept. Although this girl had never before seen a European, she seemed in no way discomposed at my visit, and gave me a large slice of fresh curd.

Five miles further on we arrived at the tents of the Phipun, whose wife was prepared to entertain us with Tartar hospitality: magnificent tawny Tibet mastiffs were baying at the tent-door, and some yaks and ponies were grazing close by. We mustered twelve, and sat cross-legged in a circle inside the tent, the Soubah and myself being placed on a Chinese rug. Salted and buttered tea was prepared in a tea-pot for us on the mat, and in a great cauldron for the rest of the party; parched rice and wheat-flour, curd, and roasted maize\* were offered us, and we each produced our wooden cup, which was kept constantly full of scalding tea-soup, which, being made with fresh butter, was very good. The flour was the favourite food, of which each person dexterously formed little dough-balls in his cup, an operation I could not manage, and only succeeded in making a nauseous paste, that stuck to my jaws and in my throat.

\* Prepared by roasting the maize in an iron vessel, when it splits and turns partly inside out, exposing a snow-white spongy mass of farina. It looks very handsome, and would make a beautiful dish for dessert.

We were suddenly startled from our repast by a noise like loud thunder, crash following crash, and echoing through the valley. The Phipun got up, and coolly said, "The rocks are falling, it is time we were off, it will rain soon." The moist vapours had by this time so accumulated, as to be condensed in rain on the cliffs of Chomiomo and Kinchinjhow; which, being loosened, precipitated avalanches of rocks and snow. We proceeded amidst dense fog, soon succeeded by rain; the roar of falling rocks on either hand increasing as these invisible giants spoke to one another in voices of thunder through the clouds. The effect was indescribably grand; and as the weather cleared, and I obtained transient peeps of precipices of blue ice and black rock towering 5000 feet above me on either hand, the feeling of awe produced was almost overpowering. Heavy banks of vapour still veiled the mountains, but the rising mist exposed a broad stony track, along which the Lachen wandered, split into innumerable channels, and enclosing little oases of green vegetation, lighted up by occasional gleams of sunshine. Though all around was enveloped in gloom, there was in front a high blue arc of cloudless sky, between the beetling cliffs that formed the stern portals of the Kongra Lama pass.

## CHAPTER XXI.

Top of Kongra Lama—Tibet frontier—Elevation—View—Vegetation—Descent to Tungu—Tungu-choo—Ponies—Kinchinhow and Changokhang mountains—Palung plains—Tibetans—Dogs—Dingcham province of Tibet—Inhabitants—Dresses—Women's ornaments—Blackening faces—Coral—Tents—Elevation of Palung—Lama—Shawl-wool goats—Shearing—Siberian plants—Height of glaciers, and perpetual snow—Plants, and wild animals—Marmots—Insects—Birds—Choongtam Lama—Religious exercises—Tibetan hospitality—*Delphinium*—Perpetual snow—Return to Tallum Samdong—To Lamting—Houses—Cicadas—Landslips—Arrival at Choongtam—Cobra—Rage—Velocity and volume of rivers measured—Leave for Lachoong valley—Keadom—General features of valley—Lachoong village—Tunkra mountain—Moraines—Cultivation—Lachoong Phipun—Lama ceremonies beside a sick-bed.

WE reached the boundary between Sikkim and Tibet early in the afternoon; it is drawn along Kongra Lama, which is a low flat spur running east from Kinchinhow towards Chomiomo, at a point where these mountains are a few miles apart, thus crossing the Lachen river: it is marked by cairns of stone, some rudely fashioned into chaits, covered with votive rags on wands of bamboo. I made the altitude by barometer 15,745 feet above the sea, and by boiling water, 15,694 feet: the temperature of the air varied from  $41\frac{1}{2}^{\circ}$  to  $42\frac{1}{2}^{\circ}$ ; that of the Lachen river was  $47^{\circ}$ , which was remarkably high. We were bitterly cold; as the previous rain had

wetted us through, and a keen wind was blowing. The mist and fog intercepted all view, except of the flanks of the mountains on either hand, of the rugged snowy ones to the south, and of those bounding the Lachen to the north. The latter were unsnowed, and appeared lower than Kongra Lama, but when I ascended them, three months afterwards, I found they were 3000 feet higher! a proof how utterly fallacious are estimates of height, when formed by the eye alone.

Isolated patches of vegetation appeared on the top of the pass, where I gathered forty kinds of plants, most of them being of a tufted habit characteristic of an extreme climate; some forming hemispherical balls on the naked soil, others growing in matted tufts level with the ground. The greater portion had no woolly covering, nor did I find any of the cottony species of *Saussurea*, which are so common at equal elevations on the moister mountains to the southward. Some most delicate-flowered plants even defy the biting winds of these exposed regions; such as a prickly *Meconopsis* with slender flower-stalks and four large blue poppy-like petals, a *Cyananthus* with a bell-shaped corolla, and a fritillary. Other curious plants were a little yellow saxifrage with long runners, and the strong-scented spikenard.

We made a fire at the top with sheep's droppings (of which the Phipun had brought up a bagful), with the aid of a pair of goat-skin bellows, which worked by a slit that was opened by the hand in the act of raising; when inflated the hole was closed, and the skin pressed

down, thus forcing the air through the bamboo nozzle : this is the common form of bellows throughout Tibet and the Himalaya.

After two hours I was very stiff and cold, and suffering from headache and giddiness, owing to the elevation ; and having walked about thirteen miles botanizing, I was glad to ride back. We reached the Phipun's tents about 6 P.M., and had more tea before proceeding to Tungu. The night was fortunately fine and calm, with a few stars and a bright young moon, which, with the glare from the snows, lighted up the valley, and revealed magnificent glimpses of the majestic mountains. As the moon sank, and we descended the narrowing valley, darkness came on, and with a boy to lead my sure-footed pony, I was at liberty to reflect on the events of a day on which I had attained the object of so many years' ambition. Now that all obstacles were surmounted, and I was returning laden with materials for extending the knowledge of a science which had formed the pursuit of my life, will it be wondered at that I felt proud, not less for my own sake, than for that of the many friends who were interested in my success ?

We arrived at Tungu at 9 P.M., my pony not having stumbled once, though the path was rugged, and crossed by many rapid streams. The Soubah's little shaggy steed had carried his portly frame (fully fifteen stone weight) the whole way out and back, and when he dismounted, it shook itself, snorted, and seemed quite ready for supper.

On the 26th of July the Phipun, who waited on

me every morning with milk and butter, and whose attentions were now unremitting, proposed that I should accompany him to an encampment of Tibetans, at the foot of Kinchinjhow. We mounted ponies, and ascended the Tunguchoo eastwards: it was a rapid river for the first thousand feet, flowing in a narrow gorge, between sloping, grassy, and rocky hills, on which large herds of yaks were feeding, tended by women and children, whose black tents were scattered about. The yak-calves left their mothers to run beside our ponies, which became unmanageable, being almost callous to the bit; and the whole party was sometimes careering over the slopes, chased by the grunting herds: in other places, where the path was narrow and dangerous, the sagacious animals proceeded with the utmost gravity and caution. Rounding one rocky spur, my pony stumbled, and pitched me forwards; fortunately I alighted on the path.

A sudden bend in the valley opened a superb view of Kinchinjhow, its perpendicular sides extending for four or five miles east and west, and studded with immense icicles, which are said to have obtained for it the name of "jhow," — the "bearded" Kinchin. Eastward a jagged spur stretched south, rising into another splendid mountain called Chango-khang (the Eagle's crag), from whose flanks descend great glaciers, the sources of the Tunguchoo.

We followed the course of an affluent, called the Chachoo, along whose bed ancient moraines rose in successive ridges: over one of these the path ascends to the plains of Palung, an elevated grassy expanse,

two miles long and four broad, extending northward to the base of Kinchinjhow. Its surface, though very level for so mountainous a country, is yet varied with open valleys and sloping hills, upwards of 500 feet high : it is bounded on the west by low rounded spurs from Kinchinjhow, that form the flank of the Lachen valley ; while on the east it is separated from Chango-khang by the Chachoo, which cuts a deep east and west trench immediately under the cliffs of Kinchinjhow, and then turns south to the Tunguchoo. The lower course of the Chachoo is most curious ; it meanders in sickle-shaped curves along the marshy bottom of an old lake-bed, with steep shelving sides, 500 feet deep, and covered with juniper bushes. It is fed by the glaciers of Kinchinjhow, and some little lakes to the east.

The mean height of Palung plains is 16,000 feet : they are covered with transported blocks, and I have no doubt their surface has been much modified by glacial action. I was forcibly reminded of them by the slopes of the Wengern Alp, but those of Palung are far more level. The ice-clad cliffs of Kinchinjhow rise before the spectator, just as those of the Jungfrau, Mönch, and Eigher Alp do from that magnificent point of view.

On ascending a low hill, we came in sight of the Tibet camp at the distance of a mile, when the great mastiffs that guarded it immediately bayed ; and our ponies starting off at full gallop, we soon reached an enclosure of stone dykes, within which the black tents were pitched. The dogs were of immense size, and ragged, like the yaks, from their winter coat hanging

to their flanks in great masses ; each was chained near a large stone, on and off which he leapt as he gave tongue ; they are very savage, but great cowards, and not remarkable for intelligence.

The people were natives of the adjacent province of Dingcham, which is the loftiest, coldest, most windy and arid in Eastern Tibet ; they repair yearly to Palung, with their flocks, herds, and tents, paying tribute to the Sikkim Rajah for the privilege : they arrive in June and leave in September. Both men and women were indescribably filthy ; as they never wash, their faces were perfectly black with smoke and exposure, and the women's with a pigment of grease as a protection from the wind. The men were dressed as usual in the blanket-cloak, with brass pipes, long knives, flint, steel, and amulets ; the women wore similar, but shorter cloaks, with silver and copper girdles, trowsers, and flannel boots. Their head-dresses were very remarkable. A circular band of plaited yak's hair was attached to the back hair, and encircled the head like a saint's glory, at some distance round it. A band crossed the forehead, from which coins, corals, and turquoises, hung down to the eyebrows, while lappets of these ornaments fell over the ears. Their hair was plaited in two tails, brought over the shoulders, and fastened together in front ; and a little yellow felt cap, transversely elongated, so as not to interfere with the shape of the glory, was perched on the head. Their countenances were pleasing, and their manners timid.

The children crawled half-naked about the tent, or



burrowed like moles in an immense heap of goats' and sheep's droppings, piled up for fuel, upon which the family lounged. An infant in arms was playing with a "coral," ornamented much like ours, and was covered



LEPCHA GIRLS (THE OUTER FIGURES), AND TIBETAN WOMEN.

with jewels and coins. This custom of decorating children is very common amongst half-civilised people; and the coral is, perhaps, one of the last relics of a barbarous age that is retained amongst ourselves. One mother was nursing her baby, and churning at the same time, by rolling the goat-skin of yak-milk about on the ground. Extreme poverty induces the practice of nursing the children for years; and in one tent I

saw a lad upwards of four years of age unconcernedly taking food from his aunt, and immediately afterwards chewing hard dry grains of maize.

The tents were pitched in holes about two feet and a half deep; and within the tent a wall of similar height was built all round: in the middle was a long clay arched fire-place, with holes above, over which the cauldrons were placed, the fire being underneath. Saddles, horse-cloths, and the usual accoutrements and implements of a nomade people, all of the rudest description, hung about: there was no bed nor stool, but Chinese rugs for sleeping on. I boiled water on the fire-place, and obtained an elevation of 15,867 feet.

A Lama accompanied this colony of Tibetans, a festival in honour of Kinchinjhow being annually held at a large chait hard by, which is painted red, ornamented with banners, and surmounted by an enormous yak's skull, that faces the mountain. The Lama invited me into his tent, where I found a wife and family. An extempore altar was at one end, covered with wafers and other pretty ornaments, made of butter, stamped or moulded with the fingers.\* The tents being insupportably noisome, I preferred partaking of the buttered brick-tea in the open air; after which, I went to see the shawl-wool goats sheared in a pen close by. There are two varieties: one is a large animal, with great horns, called "Rappoo;" the other smaller, and with slender horns, is called "Tsilloo."

\* The extensive use of these ornaments throughout Tibet, on the occasion of religious festivals, is alluded to by MM. Huc and Gabet.

The latter yields the finest wool, but they are mixed for ordinary purposes. I was assured that the sheep (of which large flocks were grazing near) afford the finest wool of any. The animals were caught by the tail, their legs tied, the long winter's hair pulled out, and the remainder cut away with a broad flat knife, which was sharpened with a scythe-stone. The operation was clumsily performed, and the skin much cut.

Turnips are grown at 'Palung during the short stay of the people, and this is the most alpine cultivation in Sikkim; the seed is sown early in July, and the tubers are fit to be eaten in October, if the season is favourable. They did not come to maturity this year, as I found on again visiting this spot in October; but their tops had afforded the poor Tibetans some good vegetables. The mean temperature of the three summer months at Palung is probably about 40°, an element of comparatively little importance in regulating the growth and ripening of vegetables at great elevations in Tibetan climates; where a warm exposure, the amount of sunshine, and of radiated heat, have a much greater influence.

On the top of the surrounding hills, which, for barrenness, reminded me of the descriptions given of the Siberian Steppes, I found, at 17,000 feet elevation, several minute arctic plants, with *Rhododendron nivale*, the most alpine of woody plants. On their sterile slopes grew a curious plant allied to the *Cherleria* of the Scotch Alps, forming great hemispherical balls on the ground, eight to ten inches across, altogether

resembling in habit the curious Balsam-bog (*Bolax glebaria*) of the Falkland Islands, which grows in very similar scenes.

A few days afterwards, I again visited Palung, with the view of ascertaining the height of perpetual snow on the south face of Kinchinjhow; unfortunately, bad weather came on before I reached the Tibetans, from whom I obtained a guide in consequence. From this place a ride of about four miles brought me to the source of the Chachoo, in a deep ravine, containing the terminations of several short, abrupt glaciers, and into which were precipitated avalanches of snow and ice. I found it impossible to distinguish the glacial ice from the perpetual snow; the larger beds of snow, where presenting a flat surface, being generally drifts collected in hollows, or accumulations that had fallen from above: when these rest on slopes they become converted into ice, and, obeying the laws of fluidity, flow downwards as glaciers. It was snowing heavily at this time, and we crouched under a gigantic boulder, benumbed with cold. I had fortunately brought a small phial of brandy, which, with hot water from the apparatus for taking elevations, refreshed us wonderfully.

The plants found close to the snow were minute primroses, Parnassia, Draba, tufted wormwoods, saxifrages, gentian, small Compositæ, grasses, and sedges. Our ponies unconcernedly scraped away the snow with their hoofs, and nibbled the scanty herbage. When I mounted mine, he took the bit between his teeth, and scampered back to Palung, over rocks and

hills, through bogs and streams ; and though the snow was so blinding that no object could be distinguished, he brought me to the tents with unerring instinct, as straight as an arrow.

Wild animals are few in kind and rare in individuals, at Tungu and elsewhere on this frontier ; though there is no lack of cover and herbage. This must be owing to the moist cold atmosphere ; and it reminds me that a similar want of animal life is characteristic of those climates at the level of the sea, which I have adduced as bearing a great analogy to the Himalaya, in the want of certain natural orders of plants. Thus, New Zealand and Fuegia possess, the former no land animal but a rat, and the latter very few indeed, and none of any size. Such is also the case in Scotland and Norway. Again, on the damp west coast of Tasmania, quadrupeds are rare ; whilst the dry eastern half of the island once swarmed with opossums and kangaroos. A few miles north of Tungu, the sterile and more lofty provinces of Tibet abound in wild horses, antelopes, hares, foxes, marmots, and numerous other quadrupeds ; although their altitude, climate, and scanty vegetation are apparently even more unsuited to support such numbers of animals of so large a size than the karroos of South Africa, and the steppes of Siberia and Arctic America, which similarly abound in animal life. The laws which govern the distribution of large quadrupeds seem to be intimately connected with those of climate ; and we should have regard to these considerations in our geological speculations, and not draw hasty conclusions from the

absence of the remains of large herbivora in formations disclosing a redundant vegetation.

Besides the wild sheep found on these mountains, a species of marmot sometimes migrates in swarms (like



TIBET MARMOT.

the Lapland "Lemming") from Tibet as far as Tungu. There are few birds but red-legged crows and common ravens. Most of the insects belonged to arctic types, and they were numerous in individuals.

The Choongtam Lama was at a small temple near Tungu during the whole of my stay, but he would not come to visit me, pretending to be absorbed in his devotions. Passing one day by the temple, I found him catechising two young aspirants for holy orders. He wore his mitre, and was seated cross-legged on the grass with his scriptures on his knees: he put questions to the boys, when he who answered best took

the other some yards off, put him down on his hands and knees, threw a cloth over his back, and mounted; then kicking, spurring, and cuffing his steed, he was galloped back to the Lama and kicked off; when the catechising recommenced.

I spent a week at Tungu most pleasantly, ascending the neighbouring mountains, and mixing with the people, whom I found uniformly kind, frank, and extremely hospitable; sending their children after me to invite me to stop at their tents, smoke, and drink tea; often refusing any remuneration, and giving my attendants curds and yak-flesh. If on foot, I was entreated to take a pony; and when tired I never scrupled to catch one, twist a yak-hair rope over its jaw as a bridle, and throwing a goat-hair cloth upon its back (if no saddle were at hand), ride away whither I would. Next morning a boy would be sent for the steed, perhaps bringing an invitation to come and take it again. So I became fond of brick-tea boiled with butter, salt, and soda; and expert in the Tartar saddle; riding about perched on the shoulders of a rough pony, with my feet nearly on a level with my pockets, and my knees almost meeting in front.

On the 28th of July much snow fell on the hills around, and rain at Tungu; the former soon melted, and I made an excursion to Chomiomo on the following day, hoping to reach the line of perpetual snow. Ascending the valley, I struck north up a steep slope, that ended in a spur of vast masses of quartz and felspar, piled like slabs in a stone quarry.

Large silky cushions of a forget-me-not grew amongst the rocks, spangled with beautiful blue flowers, and looking like turquoises set in silver: the *Delphinium glaciale* was also abundant, exhaling a rank smell of musk. It indicates a very great elevation in Sikkim, and on my ascent far above it, therefore, I was not surprised to find an altitude of 16,754 feet.

A dense fog, with sleet, shut out all view; and I did not know in what direction to proceed higher, beyond the top of the sharp, stony ridge I had attained. Here there was no perpetual snow, which is to be accounted for by the nature of the surface facilitating its removal, the edges of the rocks which project through the snow, becoming heated, and draining off the water as it melts.

I left Tungu on the 30th of July, and spent that night at Tallum, where a large party of men had just arrived, with loads of madder, rice, canes, bamboos, planks, &c., to be conveyed to Tibet on yaks and ponies.\* On the following day I descended to Lamteng, gathering a profusion of fine plants by the way.

The flat on which I had encamped at this place in May and June being now a marsh, I took up my abode for two days in one of the houses, and paid the usual penalty of communication with these filthy people; for which my only effectual remedy was boiling all my

\* About 300 loads of timber, each of six planks, are said to be taken across the Kongra Lama pass annually; and about 250 of rice, besides canes, madder, bamboos, cottons, cloths, and *Symplocos* leaves for dyeing. This is, no doubt, a considerably exaggerated statement, and may perhaps refer to both the Kongra Lama and Donkia passes.



garments and bedding. Yet the house was high, airy, and light; the walls composed of bamboo, lath, and plaster.

Tropical Cicadas ascend to the pine-woods above Lamteng in this month, and chirp shrilly in the heat of the day; and glow-worms fly about at night. The common Bengal and Java toad abounded in the marshes, a remarkable instance of wide geographical distribution, for a Batrachian which is common at the level of the sea under the tropics.

On the 3rd of August I descended to Choongtam, which I reached on the 5th.

Terrific landslips had taken place along the valley, carrying down acres of rock, soil, and pine-forests, into the stream; and I saw one which swept over 100 yards in breadth of forest. The bridge at the Tuktoong being carried away, we had to ascend for 1000 feet to a place where the river could be crossed. In many places we had great difficulty in proceeding, the track being obliterated by the rains and landslips. Along the flats, now covered with a dense vegetation, we waded often knee-deep in mud, swarming with leeches; and instead of descending into the valley of the now swollen Lachen, we made long detours, rounding spurs by canes and bamboos suspended from trees.

The venomous black cobra was common, and we left the path with great caution, as it is a lazy reptile, and lies basking in the sun; many beautiful and harmless green snakes, four feet long, glided amongst the bushes. My dogs caught a "Rageu," a very

remarkable animal, half goat and half deer; the flesh was good and tender, dark-coloured, and lean.

I remained here till the 15th of August, arranging my Lachen valley collections previous to starting for the Lachoong, whence I hoped to reach Tibet by a different route, crossing the Donkia pass, and thence exploring the sources of the Teesta at the Cholamoo lakes.

Whilst here I ascertained the volume and velocity of the Lachen and Lachoong rivers. Both were rapid torrents, the rains being at their height, and the melting of the snows at its maximum. I first measured several hundred yards along the banks of each river above the bridges, and then I timed floating masses thrown in at the upper point. I was surprised to find the velocity of the Lachen only nine miles an hour, for its waters seemed to shoot past with the speed of an arrow. The breadth of the river averaged sixty-eight feet, and the discharge was 4,420 cubic feet of water in a second.

The mean velocity of the Lachoong was eight miles an hour, the breadth ninety-five feet, the depth about the same as that of the Lachen, and the discharge 5,700 cubic feet of water in a second.\*

On the 15th of August, having received supplies from Dorjiling, I started up the north bank of the

\* Hence it appears that the Lachoong, being so much the more copious, should in one sense be regarded as the main stream of the Teesta, rather than the Lachen, which, however, has by far the most distant source. Their united streams discharge upwards of 10,000 cubic feet of water per second in the height of the rains! which, is, however, a mere fraction of the discharge of the Teesta where that river leaves the Himalaya. The Ganges, where it leaves the Himalaya at Hurdwar, discharges 8000 feet per second during the dry season.

Lachoong, with the Singtam Soubah, who accompanied me officially, and with a very bad grace ; poor fellow, he expected me to have gone back to Dorjiling, and many a sore struggle we had on this point. At Choongtam he had been laid up with ulcerated legs from the bites of leeches and sand-flies, which required my treatment.

We crossed to the south bank by a fine cane-bridge forty yards long, the river being twenty-eight across : and here I have to record the loss of my dog Kinchin ; the companion of all my late journeyings, and to whom I had become really attached. He had a bad habit, of which I had vainly tried to cure him, of running for a few yards on the round bamboos by which the cane-bridges are crossed, and on which it was impossible for a dog to retain his footing : in this situation he used to get thoroughly frightened, and lie down with his legs hanging over the water, and having no hold whatever. I had several times rescued him from this perilous position, which was always rendered more imminent from the shaking of the bridge as I approached him. On the present occasion, I had stopped below the bridge, botanizing, and Kinchin having scrambled up the rocks, ran on to the bridge. I could not see him, and was not thinking about him, when suddenly his shrill, short barks of terror rang above the roaring torrent. I hastened to the bridge, but before I could get to it, he had lost his footing, and had disappeared. Holding on by the canes, I strained my eyes till the bridge seemed to be swimming up the valley, and the swift waters to be standing still, but to

no purpose; he had been carried under at once, and swept away miles below. For many days I missed him by my side on the mountain, and by my feet in my tent. He had become a very handsome dog, with glossy black hair, pendent triangular ears, short muzzle, high forehead, jet-black eyes, straight limbs, arched neck, and a most glorious tail curling over his back.

A very bad road led to the village of Keadom, situated on a flat terrace several hundred feet above the river, where I spent the night. Here are cultivated plantains and maize, although the elevation is equal to parts of Dorjiling, where these plants do not ripen.

In the afternoon we reached Lachoong, which is by far the most picturesque village in the temperate region of Sikkim. Grassy flats of different levels, sprinkled with brushwood and scattered clumps of pine and maple, occupy the valley; whose west flanks rise in steep, rocky, and scantily wooded grassy slopes. About five miles to the north the valley forks; two conspicuous domes of snow rising from the intermediate mountains. On the east, Tunkra mountain rises in a superb unbroken sweep of dark fir-wood and cliffs, surmounted by black rocks and white fingering peaks of snow. South of this, the valley of the Tunkrachoo opens, backed by sharp snowed pinnacles, which form the continuation of the Chola range; over which a pass leads to the Phari district of Tibet, which intervenes between Sikkim and Bhotan. Southwards the view is bounded by snowy mountains, and the valley seems blocked up by a remarkable moraine-like spur.



Lereh.

LACHOONG VALLEY AND VILLAGE, LOOKING SOUTH.



*Alta Smithiana.*

*Larch.*

*Alta Bransiana.*

LOFTY ANCIENT MORAINES IN THE LACBOONG VALLEY, LOOKING SOUTH-EAST.

Stupendous moraines rise 1,500 feet above the Lachoong in several concentric series, curving downwards and outwards, so as to form a bell-shaped mouth to the valley of the Tunkrachoo. Those on the upper flank are much the largest; and the loftiest of them terminates in a conical hill crowned with Boodhist flags, and its steep sides are cut into horizontal roads or terraces, one of which is so broad and flat as to suggest the idea of its having been cleared by art. On the south side of the Tunkrachoo river the moraines are also more or less terraced, as is the floor of the Lachoong valley, and its east slopes, 1000 feet up.\*

The river is fourteen yards broad, and neither deep nor rapid: the village is on the east bank, and contains fully 100 good wooden houses, raised on posts, and clustered together without order. It was muddy and intolerably filthy, and intersected by some small streams, whose beds formed the roads, and at the same time the common sewers of the natives. There was some wretched cultivation in fields,† of wheat,

\* I have since been greatly struck with the similarity between the features of this valley, and those of Chamouni, (though the latter is on a smaller scale) above the Lavanchi moraine. The spectator standing in the expanded part below the village of Argentière, and looking upwards, sees the valley closed above by the ancient moraine of the Argentière glacier, and below by that of Lavanchi; and on all sides the slopes are cut into terraces, strewed with boulders. The average slope of these pine-clad Sikkim valleys much approximates to that of Chamouni, and never approaches the precipitous character of the Bernese Alps' valleys, Kandersteg, Lauterbrunnen, and Grindenwald.

† Full of such English weeds as shepherd's purse, nettles, and dock; besides many Himalayan ones, as balsams, thistles, a beautiful geranium, mallow, and Cucurbitaceous plants.

barley, peas, radishes, and turnips. Rice was once cultivated at this elevation (8000 feet), but the crop was uncertain; some very tropical grasses grow wild here. In gardens the hollyhock is seen; said to have been introduced through Tibet from China; also *Pinus excelsa* from Bhotan, peaches, walnuts, and weeping willows. A tall poplar was pointed out to me as a great wonder; it had two species of *Pyrus* growing on its boughs, evidently from seed; one was a mountain ash, the other like *Pyrus Aria*.

Soon after camping, the Lachoong Phipun, a very tall, intelligent, and agreeable-looking man, waited on me with the usual presents, and a request that I would visit his sick father. His house was lofty and airy: in the inner room the sick man was stretched on a board, covered with a blanket, and dying of pressure on the brain; he was surrounded by a deputation of Lamas from Teshoo Loombo, sent for in this emergency. The principal one was a fat fellow, who sat cross-legged before a block-printed Tibetan book, plates of raw meat, rice, and other offerings, and the bells, dorje, &c. of his profession. Others sat around, reading or chanting services, and filling the room with incense. At one end of the apartment was a good library in a beautifully carved book-case.



## CHAPTER XXII.

Leave Lachoong for Tunkra pass—Moraines and their vegetation—Pines of great dimensions—Wild currants—Glaciers—Summit of pass—Elevation—Views—Plants—Winds—Lacheepia rock—Extreme cold—Kinchinunga—Himalayan grouse—Return to Lachoong—Ascent to Yeumtong—Flats and debâcles—Buried pine-trunks—Hot-springs—Behaviour of Singtam Soubah—Leave for Momay Samdong—Upper limit of trees—Glacial terraces, &c.—Forked Donkia—Ascent to Donkia pass—Scenery—Lakes—Tibet—Bhomtsao—Arun river—Kiang-lah mountains—Yaru-Tsampu river—Appearance of Tibet—Kinchinjhaw, and Kinchinunga—Chola range—Deceptive appearance of distant landscape—Perpetual snow—Pulses—Plants—Tripe de roche—Return to Momay—Dogs and yaks—Birds—Insects—Quadrupeds—Hot springs—Marmots—Kinchinjhaw glacier.

THE Singtam Soubah being again laid up here from the consequences of leech-bites, I took the opportunity of visiting the Tunkra-lah pass, represented as the most snowy in Sikkim; which I found to be the case. The route lay over the moraines on the north flank of the Tunkrachoo, which are divided by narrow dry gullies, and composed of enormous blocks disintegrating into a deep layer of clay. All are clothed with luxuriant herbage and flowering shrubs, besides small larches and firs, rhododendrons, and maples; with *Pyrus*, cherry, *Pieris*, laurel, and *Goughia*. The musk-deer inhabits these woods, and at this season I

have never seen it higher. Large monkeys are also found on the skirts of the pine-forests, and a curious long-tailed animal, *Ailurus ochraceus*, peculiar to the Himalaya, something between a diminutive bear and a squirrel. In the dense and gigantic forest of *Abies Brunoniana* and silver fir, I measured one of the former trees, and found it twenty-eight feet in girth, and above 120 in height. The silver fir attains thirty-five feet in girth, with a trunk unbranched for forty feet.

The path was narrow and difficult in the wood, and especially along the bed of the stream, where grew ugly trees of larch, eighty feet high, and abundance of a new species of alpine strawberry with oblong fruit. Currant-bushes also were plentiful, generally growing on the pine-trunks, in strange association with a small species of *Begonia*, a hothouse tribe of plants in England. Emerging from the forest, vast old moraines are crossed, in a shallow mountain valley, several miles long and broad, 12,000 feet above the sea, choked with rhododendron shrubs, and nearly encircled by snowy mountains. Heavy rain fell in the afternoon, and we halted under some rocks: as I had brought no tent, my bed was placed beneath the shelter of one, near which my followers burrowed.

On the next morning we proceeded up the valley, towards a very steep rocky barrier, through which the river cut a narrow gorge, and beyond which rose lofty snowy mountains; the peak of Tunkra being to our left hand (north). Saxifrages grew here in profuse tufts of golden blossoms, with rushes,

mountain-sorrel and the bladder-headed *Saussurea*, whose flowers are enclosed in inflated membranous bracts, and smell like putrid meat; there were also splendid primroses, the spikenard, valerian, and golden *Potentillas*.

The ascent was steep and difficult, up a stony valley bounded by precipices; in this the river flowed in a north-west direction, and we were obliged to wade along it, though its waters were bitterly cold. At 15,000 feet we passed from great snow-beds to the surface of a glacier, partly an accumulation of snow, increased by lateral glaciers: its slope was very gentle for several miles; the surface was eroded by rain, and very rough, whilst those of the lateral glaciers were ribboned, crevassed, and often conspicuously marked with dirt-bands.

A gently sloping saddle, bare of snow, which succeeds the glacier, forms the top of the Tunkra pass; it unites two snowy mountains, and opens on the great valley of the Machoo, which flows in a part of Tibet between Sikkim and Bhotan; its height is 16,083 feet above the sea. Nothing can be more different than the two slopes of this pass; that by which I had come presented a gentle snowy acclivity, bounded by precipitous mountains; while that which opened before me was a steep, rocky, broad, grassy valley, where not a particle of snow was to be seen, and yaks were feeding near a small lake not 1000 feet down. Nor were snowy mountains visible anywhere in this direction, except far to the south-east, in Bhotan. This remarkable difference of climate is due to the southerly wind

which ascends the Tibetan or Machoo valley being drained by intervening mountains before reaching this pass, whilst the Sikkim current brings abundant vapours up the Teesta and Lachoong valleys.

Very few plants grew amongst the stones at the top of the Tunkra pass, and those few were mostly different from those of Palung and Kongra Lama. A pink-flowered *Arenaria*, two kinds of *Corydalis*, the cottony *Saussurea*, and diminutive primroses, were the most conspicuous. The wind was variable, blowing alternately up both valleys, bringing much snow when it blew from the Teesta, though deflected to a north-west breeze; when, on the contrary, it blew from Tibet, it was, though southerly, dry. Clouds obscured all distant view. The temperature was  $39\frac{1}{2}^{\circ}$ , the air being extremely damp and consequently very cold.

Returning to the foot of the glacier, I took up my quarters for two days under an enormous rock overlooking the broad valley in which I had spent the previous night, and directly fronting Tunkra mountain, which bore north about five miles distant. This rock was sixty to eighty feet high, and placed on the top of a bleak ridge, facing the north; no shrub or bush being near it. The gentle slope outwards of the rock afforded the only shelter, and a more utterly desolate place than Lacheepia, as it is called, I never laid my unhoused head in. It commanded an incomparable view across the Lachoong and Lachen valleys, of the whole group of Kinchinjunga snows, from Tibet southwards, and was therefore a most valuable position for geographical purposes.

The night was misty, and though the temperature was 35°, I was miserably cold; for my blankets being laid on the bare ground, the chill seemed to strike from the rock to the very marrow of my bones. At sunrise the mist rose majestically from all the mountain-tops; but the view obtained was transient, for in less than an hour the dense fog which choked the valleys ascended to the warmed atmosphere above, and slowly threw a veil over the landscape. I waited till the last streak of snow was shut out from my view, when I descended, to breakfast on Himalayan grouse (*Tetrao-perdix nivicola*), a small gregarious bird which inhabits the loftiest mountains, and utters a short cry of "Quiok, quiok;" in character and appearance it is intermediate between grouse and partridge, and is good eating, though tough.

Hoping to obtain another view, which might enable me to correct the bearings taken that morning, I was tempted to spend a second night at Lacheepia, passing the day in botanizing and taking observations. Little rain fell during the day, but it was heavy at night, though there was fortunately no wind; and I made a more comfortable bed with tufts of juniper brought up from below. My fire was principally of wet rhododendron wood, with masses of the aromatic dwarf species, which, being full of resinous glands, blazed with fury. Next day, after a very transient glimpse of the snows, I descended to Lachoong, where I remained for some days botanizing.

During my stay at Lachoong I was several times awakened by all the noises and accompaniments of a

night-attack or alarm ; screaming voices, groans, shouts, and ejaculations, the beating of drums and firing of guns, and flambeaux of pine-wood gleaming amongst the trees, and flitting from house to house. The cause, I was informed, was the presence of a demon, who required exorcisement, and who generally managed to make the villagers remember his visit, by their missing various articles after the turmoil made to drive him away.

On the 29th of August I left Lachoong and proceeded up the valley, along a terrace covered with long grass, and bounded by lofty banks of gravel and sand. The old moraines were very difficult to cross, and on one I found a barricade, which had been erected to deceive me regarding the frontier, had I chosen this route instead of the Lachen one, in May.

Broad flats clothed with rhododendron, alternated with others covered with mud, boulders, and débris, which had flowed down from the gorges on the west, and which still contained trees, inclined in all directions, and buried up to their branches ; some of these débâcles were 400 yards across, and sloped at an angle of  $2^{\circ}$  to  $3^{\circ}$ , bearing on their surfaces blocks fifteen feet in diameter.\* They seem to subside materially, as I perceived they had left marks many feet higher on the tree-trunks. Such débâcles must often bury standing forests in a very favourable material, climate, and position for becoming fossilized.

I arrived at Yeumtong, a small summer cattle-station,

\* None were to be compared in size and extent with that at Bex, at the mouth of the Rhone valley.

the general features of which closely resemble those of the narrow Swiss valleys. The west flank was lofty and precipitous, with narrow gulleys still retaining the winter's snow; the east gradually sloped up to the two snowy domes seen from Lachoong; the bed of the valley was alternately a flat lake-bed, in which the river meandered at the rate of three and a half miles an hour, and a sudden descent, cumbered with old moraines, over which it rushed in sheets of foam. Up the valley Chango-Khang was visible, with a superb glacier descending to about 14,000 feet on its south flank. Enormous masses of rock were continually precipitated from the west side, close to the shed in which I had taken up my quarters, keeping my people in constant alarm, and causing a great commotion among the yaks, dogs, and ponies. On the opposite side of the river was a deep gorge; in which an immense glacier descended lower than any I have seen in Sikkim. I made several attempts to reach it by the gulley of its discharging stream, but was always foiled by the rocks, and the dense jungle of pines, rhododendron, and dwarf holly.

Some hot-springs burst from the bank of the Lachen a mile below the village: they are used as baths, the patient remaining three days at a time in them, only retiring to eat in a little shed close by. The discharge amounts to a few gallons per minute; the temperature at the source is  $112\frac{1}{2}^{\circ}$ , and in the bath  $106^{\circ}$ . The water has a slightly saline taste; it is colourless, but emits bubbles of sulphuretted hydrogen gas, blackening silver. A cold spring (temperature  $42^{\circ}$ ) emerged close by, and the Lachoong, not ten yards off, was  $47^{\circ}$ .

The Singtam Soubah had been very sulky since leaving Choongtam, and I could scarcely get a drop of milk or a slice of curd here. I had to take him to task severely for sanctioning the flogging of one of my men; a huntsman, who had offered me his services at Choongtam, and who was a civil, industrious fellow, though he had procured me little besides a huge monkey, which had nearly bitten off the head of his best dog. I had made a point of consulting the Soubah before hiring him, for fear of accidents; but this did not screen him from the jealousy of the Choongtam Lama, who twice flogged him in the Goompa with rattans (with the Soubah's consent), alleging that he had quitted his service for mine. My people knew of this, but were afraid to tell me, which the poor fellow did himself.

The Lachoong Phipun visited me on the 7th of September: he had officiously been into Tibet to hear what the Tibetan people would say to my going to Donkia, and finding them supremely indifferent, returned to be my guide. A month's provision for ten men having arrived from Dorjiling, I left Yeumtong the following day for Momay Samdong, the loftiest yak-grazing station in Sikkim, and within a few hours' journey of the Donkia pass.

The valley was almost level for several miles, the road continuing along the east bank of the Lachen. Shoots of stones had descended from the ravines, all of a white fine-grained granite, stained red with a minute conferva, which has been taken by Himalayan travellers for red snow; a phenomenon I never saw in Sikkim:



nor do I know any authentic record of its having been seen in the Himalaya.

At a fork of the valley several miles above Yeum-tong, and below the great glacier of Chango-Khang, the ancient moraines are prodigious, much exceeding any I have elsewhere seen, both in extent, in the size of the boulders, and in the height to which the latter are piled on one another. Many boulders I measured were twenty yards across, and some even forty; and the chaotic scene they presented baffles all description: they were scantily clothed with stunted silver firs.

Beyond this, the path crossed the river, and ascended rapidly over a mile of steeply sloping landslip, composed of angular fragments of granite, which were constantly falling from above, and were extremely dangerous. At 14,000 feet, trees and shrubs ceased, willow and honeysuckle being the last; and thence onward the valley was bleak, open, and stony, with lofty rocky mountains on either side. The south wind brought a cold drizzling rain, which numbed us, and two of the lads who had last come up from Dorjiling were seized with a remittent fever, originally contracted in the hot valleys: luckily we found some cattle-sheds, in which I left them, with two men to attend on them.

Momay Samdong is situated in a broad part of the Lachoong valley, where three streams meet; it is on the west of Chango-Khang, and is six miles south-east of Kinchinjhow, and seven south-west of Donkia: it is in the same latitude as Palung, but scarcely so lofty;

being nearly the elevation of Lacheepia (near the Tunkra pass), from which, however, its scenery and vegetation entirely differ.

I pitched my tent close to a little shed at the base of a mountain that divided the Lachoong river from a western tributary. It was a wild and most exposed spot: stony mountains, grassy on the base near the river; distant snowy peaks, stupendous precipices, moraines, glaciers, transported boulders, and rocks rounded by glacial action, formed the landscape which everywhere met the view. There was not a bush six inches high, and the only approach to woody plants were minute creeping willows and dwarf rhododendrons, with a very few prostrate junipers and Ephedra.

The base of the spur was cut into broad flat terraces, composed of sand, pebbles, and boulders; the remains, doubtless, of an enormously thick glacial deposit. Another tributary falls into the Lachoong at Momay, which leads eastwards up to an enormous glacier that descends from Donkia. Snowy mountains rise nearly all around it: those on its south and east divide Sikkim from the Phari province in Tibet; those on the north terminate in a forked or cleft peak, which is a remarkable and conspicuous feature from Momay. This, which I have called Forked Donkia, is elevated about 21,870 feet, and is the termination of a magnificent amphitheatre of stupendous snow-clad precipices, continuously upwards of 20,000 feet high, that forms the east flank of the upper Lachoong valley. From Donkia top again, the mountains sweep round to the westward, rising into fingered peaks of extraordinary magnificence;

and thence—still running west—dip to 18,500 feet, forming the Donkia pass, beyond which they rise again as the great mural mass of Kinchinjhow. This girdle of mountains encloses the head waters of the Lachoong, which rises in countless streams from its perpetual snows, glaciers, and small lakes: its northern drainage is to the Cholamoo lakes in Tibet; in which is the source of the Lachen, which flows round the north base of Kinchinjhow to Kongra Lama.

The Lachoong is here twelve or fifteen yards wide, and runs over a pebbly bed, cutting a shallow channel down to the subjacent rock, which is in some cases scooped out six or eight feet deep by its waters.

On our arrival, we found that a party of buxom, goodnatured looking girls who were tending yaks, were occupying the hut, which, however, they cheerfully gave up to my people, spreading a black tent close by for themselves; and next morning they set off with all their effects packed upon the yaks. The spot appearing highly favourable for observations, I determined to remain here during the equinoctial month, and put my people on "two-thirds allowance," *i.e.*, four pounds of rice daily for three men, allowing them to send down the valley for what more they could get. The Singtam Soubah was intensely disgusted with my determination: he accompanied me next day to the pass, and having exhausted his persuasions, threats, and warnings, about snow, wind, robbers, starvation, and Tibetan sepoy, departed on the 12th for Yeumtong, leaving me truly happy for the first time since quitting Dorjiling. I had now a

prospect of uninterruptedly following up my pursuits at an elevation little below that of Mont Blanc, surrounded by the loftiest mountains, and perhaps the vastest glaciers on the globe; my instruments were in perfect order, and I saw around me a curious and varied flora.

The morning of the 9th of September promised fair, though billowy clouds were rapidly ascending the valley. To the eastward my attention was attracted by a double rainbow; the upper was an arch of the usual form, and the lower was the curved illuminated edge of a bank of cumulus, with the orange hues below. I took the path to the Donkia pass, fording the river, and ascending in a north-east direction, along the foot of stony hills that rise at a gradual slope to broad unsnowed ridges, 18,000 to 19,000 feet high. Shallow valleys, glacier-bound at their upper extremities, descend from the still loftier rearward mountains; and in these occur lakes. About five miles up, a broad opening on the west leads to Tomo Chamo, as the eastern summit of Kinchinjhow is called. Above this the valley expands very much, and is stony and desert: stupendous mountains rear themselves on all sides, and the desolation and grandeur of the scene are unequalled in my experience.

I passed several shallow lakes at 17,500 feet; their banks were green and marshy, and supported thirty or forty kinds of plants. I collected in the dry bed of a stream a curious white substance like thick felt, formed of felspathic silt (no doubt the product of glacial streams) and the siliceous cells of infusoriæ

(Diatomaceæ). It much resembles the fossil or meteoric paper of Germany, which is also formed of the lowest tribes of fresh-water plants, though considered by Ehrenberg as of animal origin. At the head of the valley a steep crest rises between two precipitous snowy peaks, and a very fatiguing ascent (at this elevation) leads to the sharp rocky summit of the Donkia pass, 18,466 feet above the sea. The view on this occasion was obscured by clouds and fogs, except towards Tibet, in which direction it was magnificent; but as I afterwards twice ascended this pass, and also crossed it, I shall here bring together all the particulars I noted.

The Tibetan view, from its novelty, extent, and singularity, demands the first notice: the Cholamoo lake lay 1,500 feet below me, at the bottom of a rapid descent; it was a blue sheet of water, three or four miles from north to south, and one and a half broad, hemmed in by rounded spurs from Kinchinjhow on the one side, and from Donkia on the other: the Lachen flowed from its northern extremity, and turning westward, entered a broad barren valley, bounded on the north by red stony mountains, called Bhomtso, which I saw from Kongra Lama, and ascended with Dr. Campbell in the October following: though 18,000 to 19,000 feet high, these mountains were wholly un-snowed. Beyond this range lay the broad valley of the Arun, and in the extreme north-west distance, to the north of Nepal, were some immense snowy mountains, reduced to mere specks on the horizon. The valley of the Arun was bounded on the north by very

precipitous black rocky mountains, sprinkled with snow; beyond these again, snow-topped range rose over range in the clear purple distance. The nearer of these was the Kiang-lah, which forms the axis or water-shed of this meridian; its south drainage being to the Arun river, and its north to the Yaru-tsampu: it appeared forty to fifty miles off, and of great mean elevation: the vast snowy mountains that rose beyond it were, I was assured, beyond the Yaru, in the salt-lake country.\* A spur from Chomiomo cut off the view to the southward of north-west, and one from Donkia concealed all to the east of north.

The most remarkable features of this landscape were its enormous elevation, and its colours and contrast to the black, rugged, and snowy Himalaya of Sikkim. All the mountains between Donkia pass and the Arun were of a yellowish red colour, rising and falling in long undulations like dunes, and perfectly bare of perpetual snow or glaciers. Rocks everywhere broke out on their flanks, and often along their tops, but the general contour of the whole immense area was very open and undulating, like the great ranges of central Asia described by MM. Huc and Gabet. Still further, the mountains were rugged, often rising into peaks, which from the angles I took here, and subsequently at Bhomtso, cannot be below 24,000 feet, and are probably higher. The most lofty mountains were on the range

\* This salt country was described to me as enormously lofty, perfectly sterile, and fourteen days' march for loaded men and sheep from Jigatzi: there is no pasture for yaks, whose feet are cut by the rocks. The salt is dug (so they express it) from the margin of lakes; as is the carbonate of soda.

north of Nepal, not less than 120 miles distant, and, though heavily snowed, were below the horizon of Donkia pass.

Cholamoo lake lay in a broad, scantily grassed, sandy and stony valley; snow-beds, rocks, and glaciers dipped abruptly towards its head, and on its west bank a lofty brick-red spur sloped upwards from it, conspicuously cut into terraces for several hundred feet above its waters.

Donkia rises to the eastward of the pass, but its top is not visible. I ascended over loose rocks to between 19,000 and 20,000 feet, and reached vast masses of blue ribboned ice, capping the ridges, but obtained no further prospect. To the west, the beetling summit of Kinchinjhow rises at two miles' distance, 3000 to 4000 feet above the pass. A little south of it, and north of Chango-Khang, the view extends through a gap in the Sebolah range, across the valley of the Lachen, to Kinchinjunga, distant forty-two miles. The monarch of mountains looked quite small and low from this point, and it was difficult to believe it was 10,000 feet more lofty than my position. I repeatedly looked from it to the high Tibetan mountains in the extreme north-west distance, and was more than ever struck with the apparently immense distance, and consequent altitude of the latter; I put, however, no reliance on such estimates.

To the south the eye wandered down the valley of the Lachoong to the mountains of the Chola range, which appear so lofty from Dorjiling, but from here are sunk far below the horizon: on comparing these

with the northern landscape, the wonderful difference between their respective snow-levels, amounting to fully 5000 feet, was very apparent. South-east the stupendous snowy amphitheatre formed by the precipitous flank of Donkia was a magnificent spectacle.

This wonderful view forcibly impressed me with the fact, that all eye-estimates in mountainous countries are utterly fallacious, if not corrected by study and experience. I had been given to understand that from Donkia pass the whole country of Tibet sloped away in descending steppes to the Yaru river, and was more or less of a plain; and could I have trusted my eyes only, I should have confirmed this assertion so far as the slope was concerned. When, however, the levelled theodolite was directed to the distance, the reverse was found to be the case. Unsnowed and apparently low mountains touched the horizon line of the telescope; which proves that, if only 37 miles off, they must, from the dip of the horizon, be at least 1000 feet higher than the observer's position. The same infallible guide cuts off mountain-tops and deeply snowed ridges, which to the unaided eye appear far lower than the point from which they are viewed; but which, from the quantity of snow on them, must be several thousand feet higher, and, from the angle they subtend in the instrument, must be at an immense distance. The want of refraction to lift the horizon, the astonishing precision of the outlines, and the brilliancy of the images of mountains reduced by distance to mere specks, are all circumstances tending to depress them to appearance. The absence of trees, houses, and



familiar objects to assist the eye in the appreciation of distance, throws back the whole landscape; which, seen through the rarified atmosphere of 18,500 feet, looks as if diminished by being surveyed through the wrong end of a telescope.

A few rude cairns were erected on the crest of the pass, covered with wands, red banners, and votive offerings of rags. I found a fine slab of slate, inscribed with the Tibetan characters, "Om Mani Padmi om," which Meepo allowed me to take away as the reward of my exertions. The ridge is wholly formed of angular blocks of white gneiss granite, split by frost. There was no snow on the pass itself, but deep drifts and glaciers descended in hollows on the north side to 17,000 feet. The rounded northern red shoulder of Kinchinjhow by Cholamoo lake, apparently 19,000 feet high, was quite bare, and, as I have said, I ascended Donkia to upwards of 19,000 feet before I found the rocks crusted with ice, and the ground frozen. I assume, therefore, that 19,000 feet at this spot is not below the mean level at which all the snow melts that falls on a fair exposure to the south: this probably coincides with a mean temperature of 20°. Forty miles further north (in Tibet) the same line is probably at 20,000 feet; for there much less snow falls, and much more melts in proportion. From the elevation of about 19,800 feet, which I attained on Donkia, I saw a fine illustration of that atmospheric phenomenon called the "spectre of the Brocken," my own shadow being projected on a bank of thin mist that rose above the tremendous precipices on whose

crest I stood. My head was surrounded with a brilliant circular glory or rainbow.

The temperature of the Donkia pass is much higher than might be anticipated from its great elevation, and from the fact of its being always bitterly cold to the feelings. This is no doubt due to the warmth of the ascending currents, and to the heat evolved during the condensation of their vapours.

I left a minimum thermometer on the summit on the 9th of September, and removed it on the 27th, but it had been lifted and turned over by the action of the frost and snow on the loose rocks amongst which I had placed it; the latter appearing to have been completely shifted. Fortunately, the instrument escaped unhurt; the index standing at  $28^{\circ}$ .

A violent southerly wind, with a scud of mist, and sometimes snow, blew over the pass; but we found shelter on the north face, where I twice kindled a fire, and boiled my thermometers. On one occasion I felt the pulses of my party several times during two hours' repose (without eating); the mean of eight persons was  $105^{\circ}$ , the extremes being  $92^{\circ}$  and  $120^{\circ}$ , and my own  $108^{\circ}$ .

I found one flowering plant on the summit; the tufted alsinaceous one before mentioned. The Fescue grass, a little fern, and a *Saussurea* ascended nearly to the summit, and several Lichens grew on the top; also some barren mosses. At 18,300 feet, I found on one stone only a fine lichen, the "*tripe de roche*" of Arctic voyagers, and the food of the Canadian hunters; it is also abundant on the Scotch alps.

Before leaving, I took one more long look at the boundless prospect; and, now that its important details were secured, I had leisure to reflect on the impression it produced. There is no loftier country on the globe than that embraced by this view, and no more howling wilderness; well might the Singtam Soubah describe it as the loftiest, coldest, windiest, and most barren country in the world. Were it buried in everlasting snows, or burnt by a tropical sun, it might still be as utterly sterile; but with such sterility I had long been familiar. Here the colourings are those of the fiery desert or volcanic island, while the climate is that of the poles. Never, in the course of all my wanderings, had my eye rested on a scene so dreary and inhospitable. The "cities of the plain" lie sunk in no more death-like sea than Cholamoo lake, nor are the tombs of Petra hewn in more desolate cliffs than those which flank the valley of the Tibetan Arun.

On our return it drizzled and sleeted all the way, and was dark before we arrived at the tent.

At night the Tibetan dogs are let loose, when they howl dismally: on one occasion they robbed me of all my meat, a fine piece of yak's flesh. The yaks are also troublesome, and bad sleepers; they used to try to effect an entrance into my tent, pushing their muzzles under the flaps at the bottom, and awakening me with a snort and moist hot blast. Before the second night I built a turf wall round the tent, and in future slept with a heavy tripod by my side, to poke at intruders.

Birds flock to the grass about Momay; larks,

finches, warblers, abundance of sparrows, feeding on the yak-droppings, with occasionally the hoodpoe; waders, cormorants, and wild ducks were sometimes seen in the streams, but most of them were migrating south. The yaks are driven out to pasture at sunrise, and home at sunset, till the middle of the month, when they return to Yeumtong. All their droppings are removed from near the tents, and piled in heaps; as these animals, unlike their masters, will not sleep amid such dirt. These heaps swarm with the maggots of two large flies, a yellow and black, affording abundant food to red-legged crows, ravens, and swallows. The wild quadrupeds are huge sheep, in flocks of fifty, the *Ovis Ammon*, called "Gnow." I never shot one, not having time to pursue them, for they were very seldom seen, and always at great elevations. The larger marmot is common, and I found the horns of the "Tchiru" antelope. Neither the wild horse, fox, hare, nor tailless rat, cross the Donkia pass. White clover, shepherd's purse, dock, plantain, and chickweed, are imported here by yaks; but the common *Prunella* of Europe is wild, and so are a groundsel and *Ranunculus*. I also collected about 200 other plants near my tent; amongst which grasses were numerous; chiefly belonging to European genera.

I repeatedly attempted to ascend both Kinchinjhow and Donkia from Momay, and generally reached from 18,000 to 19,000 feet, but never much higher.\* The observations taken on these excursions are sufficiently

\* An elevation of 20,000, and perhaps 22,000 feet might, I should think, easily be attained by practice, in Tibet, north of Sikkim.

illustrated by those of Donkia pass: they served chiefly to perfect my map, measure the surrounding peaks, and determine the elevation reached by plants; all of which were slow operations, the weather during this month being so bad that I rarely returned dry to my tent; fog and drizzle, if not sleet and snow, coming on every day, without exception.

I made frequent excursions to the great glacier of Kinchinjhow. Its valley is about four miles long, broad and flat; Chango-Khang rears its blue and white cliffs 4,500 feet above its west flank, and throws down avalanches of stones and snow into the valley. Hot-springs burst from the ground near some granite rocks on its floor, about 16,000 feet above the sea, and only a mile below the glacier, and the water collects in pools: its temperature is  $110^{\circ}$ , and in places  $116^{\circ}$ , or  $4^{\circ}$  hotter than that of the Yeumtong hot-springs, though 4000 feet higher, and of precisely the same character. A few plants make the neighbourhood of the hot-springs a little oasis, and the large marmot is common, uttering its sharp, chirping squeak.

The terminal moraine is about 500 feet high, quite barren, and thrown obliquely across the valley, from north-east to south-west, completely hiding the glacier. From its top successive smaller parallel ridges (indicating the periodic retirements of the glacier) lead down to the ice, which must have sunk several hundred feet. This glacier descends from Kinchinjhow, the huge cliff of whose eastern extremity dips into it. The surface, less than half a mile wide, is exceedingly undulated, and covered with large pools of water,

ninety feet deep, and beds of snow, and is deeply corroded ; gigantic blocks are perched on pinnacles of ice on its surface, and the gravel cones are often twenty feet high. Between the moraine and the west flank of the valley is a large lake, with terraced banks, whose bottom is several hundred feet above that of the valley ; it is half a mile long, and a quarter broad, and fed partly by glaciers from Chango-Khang and Sebolah, and partly by filtration through the lateral moraine.



GNEISS-BLOCK WITH GRANITE BANDS, ON THE KINCHINJHOW GLACIER.

## CHAPTER XXIII.

Donkia glaciers—Moraines—Dome of ice—Honey-combed surface—Accident to instruments—Sebolah pass—Bees and May-flies—View—Lamas and travellers at Momay—Weather and climate—Sensations arising from elevation—Dr. Campbell leaves Dorjiling for Sikkim—Leave Momay—Yeumtong—Lachoong—Retardation of vegetation at low elevations—Choongtam—Landslips and débâcle—Meet Dr. Campbell—Motives for his journey—Second visit to Lachen valley—Autumnal tints—Red currants—Lachen Phipun—Tungu—Scenery—Animals—Poisonous rhododendrons—Fire-wood—Palung—Elevations—Sitong—Kongra Lama—Tibetans—Enter Tibet—Desolate scenery—Plants—Animals—Geology—Cholamoo lakes—Antelopes—Return to Yeumtso—Dr. Campbell lost—Extreme cold—Headaches—Tibetan Dingpun and guard—Arms and accoutrements—Temperature of Yeumtso—Migratory birds—Visit of Dingpun—Yeumtso lakes.

On the 20th of September I ascended to the great Donkia glaciers, east of Momay; the valley is much longer than that leading to the Kinchinjhow glacier, and at 16,000 or 17,000 feet elevation contains four marshes or lakes, alternating with as many transverse moraines that seem to have been deposited where rocks in the bed of the valley obstructed the downward progress of the ancient glacier; hence, when this latter finally retired, it rested at these obstructions, and accumulated there great deposits, which do not cross the valley, but project from each side obliquely into it. The rocks on the floor of the valley are all polished on

the top, sides, and face looking up the valley, but are rugged on that looking down it: gigantic blocks are poised on some.

Under the red cliff of Forked Donkia the valley becomes very broad, bare, and gravelly, with a confusion of moraines, and turns more northwards. At the angle, the present terminal moraine rises about 800 feet high, and from the summit a most striking scene opened. The ice filling an immense basin, several miles broad and long, formed a low dome, with Forked Donkia on the west, and a serried range of rusty-red scarped mountains, 20,000 feet high, on the north and east, separating large tributary glaciers. Other and loftier tops of Donkia appeared behind these, but I could not recognise the true summit (23,176 feet). The surface was very rugged, and so deeply honey-combed that the foot often sank from six to eight inches in crisp wet ice. I proceeded a mile on it, with much more difficulty than on any Swiss glacier; this was owing to the elevation, and the corrosion of the surface into pits and pools of water; the crevasses being but few and distant. I attained an elevation of 18,307 feet; the weather was then very cold, the thermometer fell to  $34^{\circ}$ , and it snowed heavily after 3 P.M.

On another occasion I ascended, to the north of this, a second spur from Donkia, to 19,000 feet, which abutted on the scarped precipices of that mountain; I had been attracted to the spot by its bright orange-red colour, which I found to be caused by peroxide of iron.

At these great heights the weather was never fine for more than an hour at a time, and thick snow drove





SUMMIT OF FORKED DONKIA, AND "GOA" ANTELOPES.

me down on both these occasions. Another time I ascended a third spur from this great mountain, and was overtaken by a heavy gale and thunder-storm, the latter of which is a rare phenomenon; it blew down my tripod and instruments which I had thought securely propped with stones, and the thermometers were broken, but fortunately not the barometer. On picking up the latter, which lay with its top down the hill, a large bubble of air appeared, which I passed up and down the tube, and then allowed to escape; when I heard a rattling of broken glass in the cistern. Having another barometer at my tent, I hastened to ascertain by comparison whether the instrument which had travelled with me from England, and with which I had taken so many thousand observations, were seriously injured: to my delight, however, I found the damage to be very trifling.

The Kinchinjhow spurs are not accessible to so great an elevation as those of Donkia, but they afford finer views over Tibet, across the ridge connecting Kinchinjhow with Donkia.

Broad summits here, as on the opposite side of the valley, are quite bare of snow at 18,000 feet, though where they project as sloping hog-backed spurs from the parent mountain, the snows of the latter roll down on them and form glacial caps, the reverse of glaciers in valleys, but which overflow, as it were, on all sides of the slopes.

On the 18th of September I ascended the range which divides the Lachen from the Lachoong valley, to the Sebolah pass, a very sharp ridge which runs south

from Kinchinhow to Chango-Khang; following a yak-track, which led across the Kinchinhow glacier, along the bank of the lake, and thence westward up a very steep spur, on which was much ice and snow. At nearly 17,000 feet I passed two small lakes, on the banks of one of which I found bees, a May-fly and gnat; the two latter bred on stones in the water.

The view from the summit commands the whole castellated front of Kinchinhow, the sweep of the Donkia cliffs to the east, and Chango-Khang's blunt cone of ribbed snow over head, while to the west, across the grassy Palung slopes, rise Chomiomo, the Thlonok mountains, and Kinchinjunga in the distance. The Palung plains, now yellow with withered grass, were the most curious part of the landscape: hemmed in by this range which rises 2000 feet above them, and by the Lachen hills on the east, they appeared a dead level, from which Kinchinhow reared its head, like an island from the ocean. The black tents of the Tibetans were still there, but the flocks were gone. The broad fosse-like valley of the Chachoo was at my feet, with the river winding along its bottom, and its flanks dotted with black juniper bushes.

Throughout September various parties passed my tent at Momay, generally Lamas or traders: the former, wrapped in blankets, wearing scarlet and gilt mitres, usually rode grunting yaks, which were sometimes led by a slave-boy or a mahogany-faced nun, with a broad yellow sheep-skin cap with flaps over her ears, short petticoats, and striped boots. The domestic utensils, pots, pans, and bamboos of butter, tea-churn,



VIEW FROM AN ELEVATION OF 18,000 FEET OF THE EAST TOP OF KINCHINJHAW, AND OF TIBET, OVER THE RIDGE THAT CONNECTS IT WITH DOKKIA. WILD SHEEP (OVIS AMMON) IN THE FOREGROUND.

bellows, stools, books, and sacred implements, usually hung rattling on all sides of his holiness, and a sumpter yak carried the tents and mats for sleeping. On several occasions large parties of traders, with thirty or forty yaks laden with planks, passed, and occasionally a shepherd with Tibet sheep, goats, and ponies. I questioned many of these travellers about the courses of the Tibetan rivers; they all agreed in stating the Kambajong or Chomachoo river, north of the Lachen, to be the Arun of Nepal, and that it rose near the Ramchoo lake (of Turner's route). The lake itself discharges either into the Arun, or into the Painomchoo (flowing to the Yaru); but this point I could never satisfactorily ascertain.

The weather at Momay, during September, was generally bad after 11 A.M.; little snow or rain fell, but thin mists and drizzle prevailed. The mornings were sometimes fine, cold, and sunny, with a north wind which had blown down the valley all night, and till 9 A.M., when the south-east wind, with fog, came on. Throughout the day a north current blew above the southern; and when the mist was thin, the air sparkled with spiculæ of snow, caused by the cold dry upper current condensing the vapours of the lower. This southern current passes over the tops of the loftiest mountains, ascending to 24,000 feet, and discharging frequent showers in Tibet, as far north as Jigatzi, where, however, violent dry easterly gales are said to be the most prevalent.

The equinoctial gales set in on the 21st, with a falling barometer, and sleet at night; on the 23rd and

24th it snowed heavily, and being unable to light a fire at the entrance of my tent, I spent two wretched days, taking observations; on the 25th it cleared, and the snow soon melted.

On first arriving at Momay I experienced the usual sensations accompanying great elevations, but these gradually wore off, and I was more than ever impressed with the fact that of all the phenomena of climate, the weight of the atmosphere is the most remarkable for its elusion of direct observation, when unaided by instruments. At the level of the sea, a man of ordinary bulk and stature is pressed upon by a superincumbent weight of 30,000 pounds, or  $13\frac{1}{2}$  tons. An inch rise or fall of the barometer shows that this load is lightened or increased, sometimes in a few hours, by nearly 1000 pounds; yet no notice is taken of it, except by the meteorologist, or by the speculative physician, seeking the subtle causes of epidemic and endemic complaints. At Dorjiling (7,400 feet elevation), the load is reduced to less than 22,500 pounds, with no appreciable result whatever on the frame, however suddenly it be transported to that elevation. And an observation of my own habits convinced me that I took the same amount of food, drink, sleep, exercise and work, not only without inconvenience, but without the slightest perception of my altered circumstances. On ascending to 14,000 feet, owing to the greatly diminished supply of oxygen, exercise brings on vertigo and headache; ascending higher still, lassitude and tension across the forehead ensue, with retching, and a sense of weight dragging down the stomach, probably

due to the dilatation of the air contained in that organ. Such are the all but invariable effects of high elevations; varying with most persons according to the suddenness and steepness of the ascent, the amount and duration of exertion, and the length of time previously passed at great heights. After having lived for some weeks at Momay where I was relieved of upwards of six tons of pressure (!), I have thence ascended several times to 18,500, and once above 19,000 feet, without any sensations but lassitude and quickness of pulse; but in these instances it required great caution to avoid painful symptoms. Residing at Momay, however, my functions were wholly undisturbed; nor could I detect any quickness of pulse or of respiration when the body was at rest, below 17,000 feet.

Not only is the frame of a transient visitor unaffected (when at rest) by the pressure on his body being reduced from 30,000 to 13,000 pounds, but the Tibetan, born and constantly residing at upwards of 14,000 feet, differs in no respect that can be attributed to diminished pressure, from the native of the level of the sea. The average duration of life, and the amount of food and exercise is the same; eighty years are rarely reached by either. The Tibetan, too, however inured to cold and great elevations, still suffers when he crosses passes 18,000 or 19,000 feet high, and apparently neither more nor less than I did.

Liebig remarks (in his "Animal Chemistry") that in an equal number of respirations, we consume a larger amount of oxygen at the level of the sea than on a mountain; and it can be shown that under ordinary

circumstances at Dorjiling, 20·14 per cent less is inhaled than on the plains of India. Yet the chest cannot expand so as to inspire more at once, nor is the respiration appreciably quickened; by either of which means nature would be enabled to make up the deficiency. It is true that it is difficult to count one's own respirations, but the average is considered in a healthy man to be eighteen in a minute; in my own case it is sixteen, an acceleration of which by three or four could not have been overlooked, in the repeated trials I made at Dorjiling; and still less the eight additional inhalations required at 15,000 feet to make up for the deficiency of oxygen in the air of that elevation.

It has long been surmised that an alpine vegetation may owe some of its peculiarities to the diminished atmospheric pressure; and that the latter being a condition which the gardener cannot supply, he for this reason seldom successfully cultivates such plants. I know of no foundation for this hypothesis; many plants, natives of the level of the sea in other parts of the world, and some even of the hot plains of Bengal, ascend to 12,000 and even 15,000 feet on the Himalaya, unaffected by the diminished pressure. A great number of species from low countries may be cultivated, and some have been for ages, at 10,000 to 14,000 feet without change. It is the same with the lower animals; innumerable instances may with ease be adduced of pressure alone inducing no appreciable change, whilst there is absence of proof to the contrary. The phenomena that accompany diminished pressure are the real obstacles to the cultivation of



alpine plants ; of which cold and the excessive climate are perhaps the most formidable. Plants that grow in localities marked by sudden extremes of heat and cold, are always very variable in stature, habit, and foliage. In a state of nature we say the plants "accommodate themselves to these changes," and so they do within certain limits ; but for one that survives of all the seeds that germinate in these inhospitable localities, thousands die. In our gardens we can neither imitate the conditions of an alpine climate, nor offer others suited to the plants of such climates.

On the 28th of the month the Singtam Soubah came up from Yeumtong, to request leave to depart for his home, on account of his wife's illness ; and to inform me that Dr. Campbell had left Dorjiling, accompanied (by the Rajah's orders) by the Tchebu Lama. I therefore left Momay on the 30th, to meet him at Choongtam, arriving at Yeumtong the same night, amid heavy rain and sleet.

Autumnal tints reigned at Yeumtong, and the flowers had disappeared from its heath-like flat ; a small eatable cherry with a wrinkled stone was ripe, and acceptable in a country so destitute of fruit.\* Thence I descended to Lachoong, on the 1st of October, again through heavy rain, the snow lying on Tunkra mountain at 14,000 feet. The larch was shedding its leaves, which turn red before they fall, but the annual

\* The absence of *Vaccinia* (whortleberries and cranberries) and eatable *Rubi* (brambles) in the alpine regions of the Himalaya is very remarkable, and they are not replaced by any substitute. With regard to *Vaccinium*, this is the more anomalous, as several species grow in the temperate regions of Sikkim.

vegetation was much behind that at 14,000 feet, and so many late flowers had come into blossom, that the place still looked gay and green; the blue climbing gentian (*Crawfurdia*) now adorned the bushes; this plant would be a great acquisition in English gardens. A *Polygonum* still in flower here, was in ripe fruit near Momay, 6000 feet higher up the valley.

On the following day I made a long and very fatiguing march to Choongtam, but the coolies were not all able to accomplish it. The backwardness of the flora in descending was even more conspicuous than on the previous day: the jungles, at 7000 feet, being gay with a handsome Cucurbitaceous plant. Crossing the Lachoong cane-bridge, I paid the tribute of a sigh to the memory of my poor dog, and reached my old camping-ground at Choongtam by 10 P. M., having been marching rapidly for twelve hours. My bed and tent came up two hours later, and not before the leeches and mosquitos had taxed me severely. On the 4th of October I heard the nightingale for the first time in the season.

As I expected Dr. Campbell on the following morning, I proceeded down the river to meet him: the whole valley was buried under a torrent or débacle of mud and boulders, and half a mile of its course was dammed up into a deep lake. Amongst the granite boulders brought down by this débacle, I collected some actinolites: but all minerals are extremely rare in the Sikkim Himalaya, and I never heard of a gem or crystal of any size or beauty, or of an ore of any consequence, being found in this country.

I met my friend on the other side of the mud torrent, and I was truly rejoiced to see him, though he was looking much the worse for his trying journey through the hot valleys at this season; in fact, I know no greater trial of the constitution than the exposure and hard exercise that is necessary in traversing these valleys, below 5000 feet, in the rainy season: delay is dangerous, and the heat, anxiety, and bodily suffering from fatigue, insects and bruises, banish sleep, and urge the restless traveller onward to higher and more healthy regions. Dr. Campbell had, I found, in addition to the ordinary dangers of such a journey, met with an accident which might have proved serious; his pony having been dashed to pieces by falling over a precipice, a fate he barely escaped himself, by adroitly slipping from the saddle when he felt the animal's foot giving way.

On our way back to Choongtam, he detailed to me the motives that had led to his obtaining the authority of the Deputy-Governor of Bengal (Lord Dalhousie being absent) to his visiting Sikkim. Foremost, was his earnest desire to cultivate a better understanding with the Rajah and his officers. He had always taken the Rajah's part, from a conviction that his Highness was not to blame for the misunderstandings that the Sikkim officers pretended existed between their country and Dorjiling; he had, whilst urgently remonstrating with the Rajah, insisted on forbearance on my part, and had long exercised it himself. In detailing the treatment to which I was subjected, I had not hesitated to express my opinion that the Rajah was more

compromised by it than his Dewan : Dr. Campbell, on the contrary, knew that the Dewan was the head and front of the whole system of annoyance. In one point of view it mattered little who was in the right; the transaction was a violation of good faith on the part of the Sikkim government towards the British, for which the Rajah, however helpless, was yet responsible. To act upon my representations would have been unjust, and no course remained but for Dr. Campbell to inquire personally into the matter. The authority to do this gave him further the opportunity of becoming acquainted with the country which we were bound to protect, as well by our interest as by treaty, but from which we were so jealously excluded, that should any contingency occur, we were ignorant of what steps to take for defence, and, indeed, of what we were pledged to defend.

On the 6th of October we left Choongtam for my second visit to the Kongra Lama pass, hoping to get round by the Cholamoo lakes and the Donkia pass. As the country beyond the frontier was uninhabited, the Tchebu Lama saw no difficulty in this, provided the Lachen Phipun and the Tibetans did not object. Our great obstacle was the Singtam Soubah, who (by the Rajah's order) accompanied us to clear the road, and give us every facility, but who was very sulky, and undisguisedly rude to Campbell; he was in fact extremely jealous of the Lama, who held higher authority than he did, and who alone had the Rajah's confidence.

Our first day's march up the Lachen valley was of

about ten miles to one of the river-flats, which was covered with wild apple-trees, whose fruit, when stewed with sugar, we found palatable. The river, though still swollen, was comparatively clear; the rains usually ceasing, or at least moderating, in October.

During the second day's march we were stopped at the Taktoong river by the want of a bridge, which the Singtam Soubah refused to exert himself to have repaired; its waters were, however, so fallen, that our now large party soon bridged it with admirable skill. We encamped the second night at Chateng, and the following day made a long march, crossing the Zemu, and ascending half-way to Tallum Samdong. The alpine foliage was rapidly changing colour; and that of the berberry turning scarlet, gave a warm glow to the mountains above the forest. Lamteng village was deserted; turnips were maturing near the houses, and buckwheat on the slope behind; the latter is a winter-crop at lower elevations, and harvested in April. At Zemu Samdong the willow-leaves were becoming sear and yellow, and the rose-bushes bore enormous scarlet hips, two inches long, and covered with bristles; they were sweet, and rather good eating. Near Tungu (where we arrived on the 9th) the great Sikkim currant was in fruit; the berries are much larger than the English, and of the same beautiful red colour, but bitter and very acid; they are, however, eaten by the Tibetans.

Near the village I found Dr. Campbell remonstrating with the Lachen Phipun on the score of the delays and rude treatment I had received in June and July:

the man, of course, answered every question with falsehoods; such being the custom of these people; and he produced the Rajah's orders for my being treated with every civility, as a proof that he must have behaved as he ought! The Singtam Soubah, as was natural, hung back, for it was owing to him alone that the orders had been contravened, and the Phipun appealed to the bystanders for the truth of this.

The Phipun (accompanied by his Larpun or subordinate officer) had prepared for us a sumptuous refreshment of tea-soup, which was brewing by the road-side, and in which all animosities were soon washed away. We took up our abode at Tungu in a wooden hut under the great rock, where we were detained for several days by bad weather: I was assured that during all August and September the weather had been uniformly gloomy, as at Momay, though little rain had fallen.

We had much to do in purchasing blankets\* for some of the people, and arranging for our journey, to which the Lachen Phipun was favourable, promising us ponies. The vegetation around was wholly changed since my July visit: the rhododendron scrub was verdigris-green from the young leaves which burst in autumn; the jungle was spotted yellow with the withered birch, maple and mountain-ash, and scarlet with berberry bushes; while above, the pastures were yellow-brown with the dead grass, and streaked with snow.

\* These were made of goat's wool, teased into a satiny surface by little teazle-like brushes of bamboo.

Amongst other luxuries, we procured the flesh of yak calves, which is excellent veal; the Tibetan mutton we generally found dry and stringy.

In these regions many of my goats and kids had died foaming at the mouth and grinding their teeth; and I here discovered the cause to arise from their having eaten the leaves of *Rhododendron cinnabarinum*, which species alone is said to be poisonous; when used as fuel, it causes the face to swell and the eyes to inflame; of which I observed several instances. As the subject of fire-wood is of every-day interest to the traveller in these regions, I may here mention that the rhododendron woods give poor fires; juniper burns the brightest, and with least smoke. The silver fir, though emitting much smoke, gives a cheerful fire, far superior to larch, spruce, or *Abies Brunoniana*. At Dorjiling, oak is the common fuel: alder is also good. Chesnut is invariably used for blacksmith's charcoal. Magnolia has a disagreeable odour, and laurel burns very badly. The phenomenon of phosphorescence is very conspicuous on stacks of fire-wood. At Dorjiling during the damp, warm, summer months (May to October), at elevations of 5 to 8000 feet, it may be witnessed every night by walking a few yards in the forest—at least it was so in 1848 and 1849; and during my stay there billets of decayed wood were repeatedly sent me by residents, with inquiries as to the cause of their luminosity. It is no exaggeration to say that one does not need to remove from the fireside to see this phenomenon, for if there is a partially decayed log amongst the fire-wood, it is almost sure to glow with

a pale phosphoric light. A stack of fire-wood, collected near my host's (Mr. Hodgson's) cottage, presented a beautiful spectacle for two months (in July and August), and on passing it at night, my pony was always alarmed by it. The phenomenon invariably accompanies decay, and is common on oak, laurel, birch, and probably other timbers; it equally appears on cut wood and on stumps, but is most frequent on branches lying close to the ground in the wet forests. I have reason to believe that it spreads with great rapidity from old surfaces to fresh-cut ones. That it is a vital phenomenon, and due to the mycelium of a fungus, I do not in the least doubt, for I have observed it occasionally circumscribed by those black lines which are often seen to bound mycelia on dead wood, and to precede a more rapid decay. I have often tried, but always in vain, to coax it into developing some fungus, by placing it in damp rooms, &c. When camping in the mountains, I have caused the natives to bring phosphorescent wood into my tent, for the pleasure of watching its soft undulating light, which appears to pale and glow with every motion of the atmosphere: but except in this difference of intensity, it presents no change in appearance night after night. Alcohol, heat, and dryness soon dissipate it; electricity I never tried. It has no odour, and my dog, who had a fine sense of smell, paid no heed when it was laid under his nose.

The weather continuing bad, and snow falling, the country people began to leave for their winter quarters at Lamteng. In the evenings we enjoyed the company



of the Phipun and Tchebu Lama, who relished a cup of sugarless tea more than any other refreshment we could offer. From them we collected much Tibetan information:—the former was an inveterate smoker, using a pale, mild tobacco, mixed largely with leaves of the small wild Tibetan Rhubarb. Snuff is little used, and is principally procured from the plains of India.

We visited Palung twice, chiefly in hopes that Dr. Campbell might see the magnificent prospect of Kinchinjhow from its plains: the first time we gained little beyond a ducking, but on the second the view was superb; and I caught a glimpse of Kinchinjunga from the neighbouring heights, bearing south-west, and distant forty miles. I also measured barometrically the elevation at the great chait at Palung, and found it 15,620 feet.

The mean temperature at Tungu had fallen from 50° in July to 41°: the weather during October, was, however, uniformly cold and misty. Much more rain fell in October at Tungu than at Dorjiling, which is the opposite to what occurs during the rainy season.

*October 15th.* Having sent the coolies forward with instructions to halt and camp on this side the Kongra Lama pass, we followed them, taking the route by Palung, and thence over the hills to the Lachen, to the east of which we descended, and further up its valley joined the advanced party in a rocky glen, called Sitong, an advantageous camping ground; being sheltered by rocks which ward off the keen blasts: its elevation is 15,370 feet above the sea, and the

magnificent west cliff of Kinchinjhow towers over it not a mile distant. The afternoon was misty, but at sunset the south-east wind fell, and was immediately succeeded by the biting north return current, which dispelled the fog : hoar-frost sparkled on the ground, and the moon shone full on the snowy head of Kinchinjhow, over which the milky-way and the broad flashing orbs of the stars formed a jewelled diadem. •

On the 16th we were up early. I felt very anxious about the prospect of our getting round by Donkia pass and Cholamoo, which would enable me to complete the few remaining miles of my survey of the Teesta river, and which promised immense results in the views I should obtain of the country, and of the geology and botany of these lofty snowless regions. Campbell, though extremely solicitous to obtain permission from the Tibetan guard, (who were waiting for us on the frontier,) was nevertheless bound by his official position to yield at once to their wishes, should they refuse us a passage.

The sun rose on our camp at 7.30 A.M., when the north wind fell ; and within an hour afterwards the temperature had risen to 45°. We started on ponies, accompanied by the Lama only, to hold a parley with the Tibetans ; ordering the rest of the party to follow more leisurely. We had not proceeded far when we were joined by two Tibetan Sepoys, who, on our reaching the pass, bellowed lustily for their companions ; when Campbell and the Lama drew up at the chait on Kongra Lama, and announced their wish to confer with their commandant.

My anxiety was now wound up to a pitch; I saw men with matchlocks emerging from amongst the rocks under Chomiomo, and despairing of permission being obtained, I goaded my pony with heels and stick, and dashed on up the Lachen valley, resolved to make the best of a splendid day, and not turn back till I had followed the river to the Cholamoo lakes. The Sepoys followed me a few paces, but running being difficult at 16,000 feet, they soon gave up the chase.

A few miles ride in a north-east direction over an open, undulating country, brought me to the Lachen, flowing westward in a broad, open, stony valley, bounded by Kinchinjhow on the south (its face being as precipitous as that on the opposite side), and on the north by a low range of rocky, sloping mountains, of which the summits were 18,000 to 19,000 feet above the sea. Enormous erratic blocks strewed the ground, which was sandy or gravelly, and cut into terraces along the shallow, winding river, the green and sparkling waters of which rippled over pebbles, or expanded into lagoons. The already scanty vegetation diminished rapidly, and consisted chiefly of scattered bushes of a dwarf scrubby honeysuckle and tufts of nettle, both so brittle as to be trodden into powder, and the short leafless twiggy Ephedra, a few inches higher. The most alpine rhododendron (*R. nivale*) spread its small rigid branches close to the ground; the hemispherical *Arenaria*, another type of sterility, rose here and there, and tufts of forget-me-not, *Artemisia*, *Astragali*, and *Androsace*, formed flat cushions level with the soil. Grass was very scarce,

but a running wiry sedge bound the sand like that of our English coasts.

A more dismally barren country cannot well be conceived, nor one more strongly contrasting with the pastures of Palung at an equal elevation. The long lofty wall of Kinchinjhow and Donkia presents an effectual barrier to the transmission of moisture to the head of the Lachen valley, which hence becomes a type of such elevations in Tibet. As I proceeded, the soil became still more sandy, chirping under the pony's feet; and where harder it was burrowed by innumerable marmots, foxes, and the "Goomchen," or tailless rat, sounding hollow to the tread, and being so dangerous that I was obliged to dismount and walk.

The upper part of Kinchinjhow is composed of bold ice-capped cliffs of gneiss, and long spurs stretch northwards from it, forming the rounded terraced hills I had seen from Donkia pass. Between these spurs were narrow valleys, at whose mouths stupendous blocks of gneiss rest on rocks of a much later geological formation.

Opposite the most prominent of these spurs the river runs west, forming marshes, which were full of *Zannichellia palustris* and *Ranunculus aquatilis*, both English and Siberian plants: the waters were full of a species of shell, and the soil near the edge, which was covered with tufts of short grass, was whitened with effloresced carbonate of soda. Here were some square stone enclosures two feet high, used as pens, and for pitching tents in; within them I gathered some unripe barley.

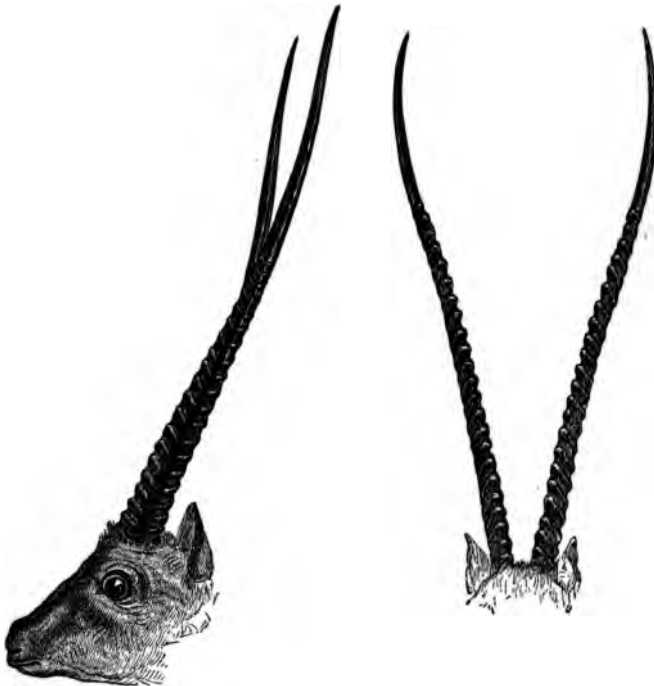
Beyond this I recognised a hill of which I had taken bearings from Donkia pass, and a few miles further, on rounding a great spur of Kinchinjhow, I arrived in sight of Cholamoo lakes, with the Donkia mountain rearing its stupendous precipices of rock and ice on the east. My pony was knocked up, and I felt very giddy from the exertion and elevation; I had broken his bridle, and so led him on by my plaid for the last few miles to the banks of the lake; and there, with the pleasant sound of the waters rippling at my feet, I yielded for a few moments to those emotions of gratified ambition which, being unalloyed by selfish considerations for the future, become springs of happiness during the remainder of one's life.

The landscape about Cholamoo lakes is simple in its elements, stern and solemn, and though my solitary situation rendered it doubly impressive to me, still I doubt whether the world contains any scene with more sublime associations than this calm sheet of water, 17,000 feet above the sea, with the shadows of mountains 22,000 to 24,000 feet high, sleeping on its bosom.

There was much short grass about the lake, on which large antelopes and deer were feeding. There were also many slate-coloured hares with white rumps, with marmots and tailless rats. The abundance of animal life was wonderful, compared with the want of it on the south side of Donkia pass, not five miles distant in a straight line! this is partly due to the profusion of carbonate of soda, of which all ruminants are fond, and partly to the dryness of the climate, which is favourable to burrowing quadrupeds. A flock of

common English teal were swimming in the lake, the temperature of which was 55°.

I had come about fifteen miles from the pass, and arrived at 1 p.m., remaining half an hour. I could not



ANTELOPE'S HEAD.

form an idea as to whether Campbell had followed or not, and began to speculate on the probability of having to pass the night in the open air, by the warm side of my steed. Though the sun shone brightly, the wind was bitterly cold, and I arrived at the stone dykes of

Yeumtso at 3 P.M., quite exhausted with fatigue and headache: I there found, to my great relief, the Tchebu Lama and Lachen Phipun in some alarm at my absence; they thought I was not aware of the extreme severity of the temperature on the north side of the snows, or of the risk of losing my way: they told me that after a long discourse with the Dingpun (or commander) of the Tibetan Sepoys, the latter had allowed all the party to pass; that they themselves had brought on the coolies, who were close behind, but that they had seen nothing of Campbell; of whom the Lama then went in search.

The sun set behind Chomiomo at 5 P.M., and the wind at once dropped; so local are these violent atmospheric currents, which are caused by the heating of the upper extremities of lofty valleys, and consequent rarefaction of the air. Intense terrestrial radiation immediately follows the withdrawal of the sun's rays, and the temperature sinks rapidly.

Soon after sunset the Lama returned, bringing Campbell; who, having mistaken some glacier-fed lakes at the back of Kinchinhow for those of Chola-moo, was looking for me. He too had speculated on having to pass the night under a rock, with one plaid for himself and servant; in which case I am sure they would both have been frozen to death, having no pony to lie down beside. He told me that after I had quitted Kongra Lama, leaving him with the Tchebu Lama and Phipun, the Tibetan Dingpun and twenty men came up, and very civilly but formally forbade his crossing the frontier; but that upon explaining his motives, and

representing that it would save him ten days' journey, the Dingpun had relented, and promised to conduct the whole party to the Donkia pass.

We pitched our little tent in the corner of the cattle pen, and our coolies soon afterwards came up ; mine were in capital health, though suffering from headaches, but Campbell's were in a distressing state of illness and fatigue, with swollen faces and rapid pulses, and some were insensible from symptoms like pressure on the brain ; these were chiefly Nepalese. The Tibetan Dingpun and his soldiers arrived last of all ; he was a droll little object, short, fat, deeply marked with small-pox, swarthy, and greasy ; he was robed in a green woollen mantle, and was perched on the back of a yak, which also carried his bedding, and cooking utensils, the latter rattling about its flanks, horns, neck, and every point of support : two other yaks bore the tents of the party. His followers were tall savage-looking fellows, with broad swarthy faces, and their hair in short pig-tails. They wore long-sleeved cloaks, short trousers and boots, all of thick woollen, and felt caps on their heads. Each was armed with a long matchlock slung over his back, with a moveable rest having two prongs like a fork, and a hinge, so as to fold up along the barrel, when the prongs project behind the shoulders like antelope horns, giving the uncouth warrior a droll appearance. A dozen cart-ridges, each in an iron case, were slung round the waist, and they also carried a long knife, flint, steel, and iron tobacco pipe, pouch, and purse, suspended from a leather girdle.



The night was fine but intensely cold, and the vault of heaven was very dark, and blazing with stars; the air was electrical, and flash lightning illumined the sky; this was the reflection of a storm that was not felt at Dorjiling, but which raged on the plains of India, beyond the Terai, fully 120 miles, and perhaps 150, south of our position. No thunder was heard. The thermometer fell to 5°; at sunrise it rose to 10°, and soon after 8 A.M. to 38°; till this hour the humidity was great, and a thin mist hung over the frozen surface of the rocky ground; when this dispersed, the air became very dry. The light of the sun, though sometimes intercepted by vapours aloft, was very brilliant.

This being the migrating season, swallows flitted through the air; finches, larches, and sparrows were hopping over the sterile soil, seeking food, though it was difficult to say what. The geese\* which had roosted by the river, cackled; the wild ducks quacked and plumed themselves; ouzels and waders screamed or chirped; and all rejoiced as they prepared themselves for the last flight of the year, to the valleys of the southern Himalaya, to the Teesta, and other rivers of the Terai and plains of India.

\* An enormous quantity of water-fowl breed in Tibet, including many Indian species that migrate no further north. The natives collect their eggs for the markets at Jigatzi, Giantchi, and Lhasa, along the banks of the Yaru river, Ramchoo, and Yarbru and Dochen lakes. Amongst other birds the Sara, or great crane of India (see "Turner's Tibet," p. 212), repairs to these enormous elevations to breed. The fact of birds characteristic of the tropics dwelling for months in such climates is a very instructive one, and should be borne in mind in our speculations upon the climate supposed to be indicated by the imbedded bones of birds.

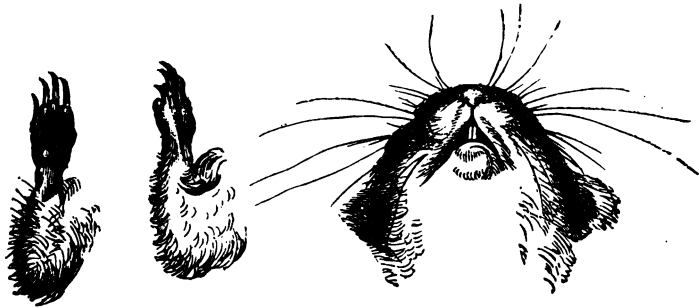
The Dingpun paid his respects to us in the morning, wearing, besides his green cloak, a white cap with a green glass button, denoting his rank; he informed us that he had written to his superior officer at Kambajong, explaining his motives for conducting us across the frontier, and he drew from his breast a long letter, written on Daphne paper, the ends of which were tied with floss silk, with a large red seal; this he pompously delivered, with whispered orders, to an attendant, and sent him off. He admired our clothes extremely,\* and then my percussion gun, the first he had seen; but above all he admired rum and water, which he drank with intense relish, leaving a mere sip for his comrades at the bottom of his little wooden cup, which they emptied, and afterwards licked clean, and replaced in his breast for him. We prepared a large basin full of very weak grog for his party, who were all friendly and polite; and having made us the unexpected offer of allowing us to rest ourselves for the day at Yeumtso, he left us, and practised his men at firing at a mark, but they were very indifferent shots.

I ascended with Campbell to the lake he had visited on the previous day, about 600 or 800 feet above Yeumtso: it is a mile and a half long, and occupies a large depression between two rounded spurs, being fed by glaciers from Kinchinjhow.

The ice on the cliffs and summit of Kinchinjhow

\* All Tibetans admire and value English broad-cloth beyond any of our products. Woollen articles are very familiar to them, and warm clothing is one of the first requisites of life.

was much greener and clearer than that on the south face (opposite Palung); and rows of immense icicles hung from the cliffs. A conferva grew in the waters of the lake, and short, hard tufts of sedge on the banks, but no other plants were to be seen. Brahminee geese, teal, and widgeon, were swimming in the waters, and a beetle was coursing over the wet banks; finches and other small birds were numerous, eating the sedge-seeds, and picking up the insects. No view could be obtained to the north, owing to the height of the mountains on the north flank of the Lachen.



HEAD AND FEET OF TIBET MARMOT.

## CHAPTER XXIV.

Ascent of Bhomtso—View of snowy mountains—Chumulari—Arun river—Jigatzi—Lhasa—Dingcham province of Tibet—Misapplication of term “Plain of Tibet”—Sheep, flocks of—Crops—Probable elevation of Jigatzi—Yaru-Tsampu river—Tame elephants—Wild horses—Cholamoo lakes—Effects of great elevation—Ascent of Donkia—Moving piles of debris—Cross Donkia pass—Second visit to Momay Samdong—Descent to Yeumtong—Lachoong—Retardation of vegetation—Jerked meat—Fish—Lose a thermometer—Lepcha lad sleeps in hot spring—Keadom—*Bucklandia*—Arrive at Choongtam—Mendicant—Meepo—Lachen—Lachoong river—Wild grape—Virulent nettle.

IN the afternoon we crossed the valley, and, after fording the river, ascended Bhomtso. Some stupendous boulders from Kinchinhow are deposited in a broad sandy track on the north bank, by ancient glaciers, which once crossed this valley from Kinchinhow.

The ascent was alternately over steep rocky slopes, and broad shelf-like flats; many more plants grew here than I had expected, in inconspicuous scattered tufts.

Bhomtso is 18,590 feet above the sea: it presented an infinitely more extensive prospect than I had ventured to anticipate, commanding all the most important Sikkim, North Bhotan, and Tibetan mountains, including Kinchinjunga and Chumulari. Due south, across the sandy valley of the Lachen, Kinchin-

jhow reared its long and rugged precipices, and under its cliffs lay the lake to which we had walked in the morning: beyond Kongra Lama were the Thlonok mountains, where I had spent the month of June; with Kinchinjunga in the distance. Westward Chomiomo rose abruptly to 22,000 feet elevation. To the east of Kinchinjhow were the Cholamoo lakes, with the rugged mass of Donkia stretching continuously southwards to Forked Donkia, which overhung Momay Samdong.

A long sloping spur sweeps from the north of Donkia to Bhomtso, rising to a height of more than 20,000 feet without snow. Over this spur the celebrated Chumulari peeps, from its isolated position and sharpness looking low and small; it appeared quite near, though thirty-nine miles distant.

North-east of Chumulari, and far beyond it, are several ranges of very much loftier mountains, which terminated the view of the snowy Himalaya; the distance embraced being fully 150 miles, and perhaps much more. Of one of these eastern masses I afterwards took bearings and angular heights from the Khasia mountains, in Bengal, upwards of 200 miles south-east of its position.

Turning to the northward, a singular contrast was presented: the broad sandy valley of the Arun lay a few miles off, and perhaps 1,500 feet below me; low brown and red ridges, 18,000 to 19,000 feet high, of stony sloping mountains with rocky tops, divided its feeders, which appeared to be dry, and to occupy flat sandy valleys. For thirty miles north not a particle of snow was to be seen; beyond that, rugged purple-

flanked and snowy-topped mountains girdled the horizon, appearing no nearer than they did from the Donkia pass, and their angular heights and bearings being almost the same as from that point of view. The nearer of these are said to form the Kiang-lah chain, the furthest I was told by various authorities are in the salt districts north of Jigatzi.

To the north-east was the lofty region traversed by Turner on his route by the Ramchoo lakes to Teshoo Loombo; its elevation may be 17,000 feet above the sea. Beyond it a gorge led through rugged mountains, by which the Painom river flows north-west to the Yaru; and at an immense distance to the north-east were the Khamba mountains, a long blue range, which divides the Lhassan or "U" from the "Tsang" or Jigatzi province of Tibet; it appeared fully 100 miles off, and was probably much more; and though so lofty as to be heavily snowed throughout, was much below the horizon-line of Bhomtso; it is crossed on the route from Sikkim to Lhassa, and is considered very lofty, from affecting the breathing.

But the mountains which appeared both the highest and the most distant on the northern landscape, were those I described when at Donkia, as being north of Nepal, and beyond the Arun river. Both Dr. Campbell and I made repeated estimates of their height and distance by the eye; comparing their size and snow-level with those of the mountains near us, and assuming 4000 to 5000 feet as the minimum height of their snowy cap, this would give them an elevation of 23,000 to 25,000 feet. An excellent telescope brought out no

features on their flanks not visible to the naked eye, and by the most careful levellings with the theodolite, they were depressed below the horizon of Bhomtso, whence the distance must be above 100 miles.

The transparency of the pale blue atmosphere of these lofty regions can hardly be described, nor the clearness and precision with which the most distant objects are projected against the sky. From having afterwards measured peaks 210 miles distant from the Khasia mountains, I feel sure that I underrated the estimates made at Bhomtso, and I have no hesitation in saying, that the mean elevation of the sparingly-snowed\* watershed between the Yaru and Arun will be found to be greater than that of the snowy Himalaya south of it, and to follow the chain running from Donkia, north of the Arun, along the Kiang-lah mountains, towards the Nepal frontier, at Tingri Maidan. No part of that watershed perhaps rises so high as 24,000 feet, but its lowest elevation is probably nowhere under 18,000 feet.

This broad belt of lofty country, north of the snowy Himalaya, is the Dingcham province of Tibet, and

\* Were the snow-level in this part of Tibet country as low as it is in Sikkim, the whole from Donkia almost to the Yaru-Tsampu river would be everywhere intersected by glaciers and other impassable barriers of snow and ice, for a breadth of fifty miles, and the country would have no parallel for amount of snow beyond the Polar circles. It is impossible to conjecture what would have been the effects on the climate of northern India and central Asia under these conditions. When, however, we reflect upon the evidences of glacial phenomena that abound in all the Himalayan valleys at and above 9000 feet elevation, it is difficult to avoid the conclusion that such a state of things once existed, and that at a geologically very recent period.

skirts the frontier of Sikkim, Bhotan, and Nepal. It gives rise to all the Himalayan rivers, and its mean elevation is probably 15,000 feet: its general appearance, as seen from greater heights, is that of a much less mountainous country than the snowy and wet Himalayan regions; this is because its mean elevation is so enormous, that ranges of 20,000 to 22,000 feet appear low and insignificant upon it. The absence of forest and other obstructions to the view, the breadth and flatness of the valleys, and the undulating character of the lower ranges that traverse its surface, give it a comparatively level appearance, and suggest the term "plains" to the Tibetan, when comparing his country with the complicated ridges of the deep Sikkim valleys. Here one may travel for many miles without rising or falling 3000 feet, yet never descending below 14,000 feet, partly because the flat winding valleys are followed in preference to exhausting ascents, and partly because the passes are seldom more than that elevation above the valleys; whereas, in Sikkim, rises and descents of 6000, and even 9000 feet, are met with in passing from valley to valley, sometimes in one day's march.

The swarthy races of Dingcham are an honest, hospitable, and very hardy people, differing from the northern Tibetans chiefly in colour, and in invariably wearing the pigtail, which MM. Huc and Gabet assure us is not usual in Lhasa.\* They are a pastoral race,

\* Amongst Lhasan customs alluded to by these travellers, is that of the women smearing their faces with a black pigment, the object of which they affirm to be that they may render themselves odious to the male sex, and thus avoid temptation. The custom is common enough, but the



and Campbell saw a flock of 400 hornless sheep, grazing on short sedges and fescue-grass, in the middle of October, at 18,000 feet above the sea. An enormous ram attended the flock, whose long hair hung down to the ground; its back was painted red.

There is neither tree nor shrub in this country; and, with the exception of a very little wheat (which seldom ripens), and occasionally peas, barley, turnips, and radishes are, I believe, the only crops. Other legumes, cabbages, &c., are cultivated in the sheltered valleys of the Yaru feeders, where great heat is reflected from the rocks; and there also stunted trees grow, as willows, walnuts, poplars, and perhaps ashes; all of which, however, are said to be planted, and scarce. Even at Teshoo Loombo and Jigatzi buckwheat is a rare crop, and only a prostrate very hardy kind is grown. Clay teapots and pipkins are the most valuable exports to Sikkim from the latter city, next to salt and soda. Jewels and woollen cloaks are also exported, the latter especially from Giantchi, which is famous for its woollen fabrics and mart of ponies.

Digarchi, Jigatzi (or Shigatzi-jong, the fort of Shigatzi), is the capital of the "Tsang" province, and Teshoo Loombo is the neighbouring city of temples and monasteries, the ecclesiastical capital of Tibet,

real object is to preserve the skin, which the dry cold wind peels from the face. The pigment is mutton-fat, blackened, according to Tchebu Lama, with catechu and other ingredients; but I believe more frequently by the dirt of the face itself. I fear I do not slander the Tibetan damsels in saying, that personal cleanliness and chastity are both lightly esteemed amongst them; and as the Lama naïvely remarked, when questioned on the subject, "the Tibetan women are not so different from those of other countries as to wish to conceal what charms they possess."

and the abode of the grand (Teshoo) Lama, or ever-living Boodh. Whether we estimate this man by the number of his devotees, or the perfect sincerity of their worship, he is without exception the most honoured being living in the world.

Of the Yaru river at Jigatzi, which all affirm becomes the Burrampooter in Assam, I have little information to add to Turner's description: it is sixty miles north of Bhomtso, and I assume its elevation there to be 13—14,000 feet; it approaches the Nepal frontier west of Tingri, and sweeping to the northward turns south to Jigatzi, whence it makes another and greater bend to the north, and again turning south flows west of Lhassa, receiving the Kechoo river from that holy city. From Jigatzi it is said to be navigable to near Lhassa by skin and plank-built boats. Thence it flows south-east to the Assam frontier, and while still in Tibet, is said to enter a warm climate, where tea, silk, cotton and rice are grown. Of its course after entering the Assam Himalaya little is known, and in answer to my enquiries why it had not been followed, I was always told that the country through which it flowed was inhabited by tribes of savages, who live on snakes and vermin, and are fierce and warlike. These are no doubt the Singpho, Bor and Bor-abor tribes who inhabit the mountains of Upper Assam. A travelling mendicant was once sent to follow up the Dihong to the Burrampooter, under the joint auspices of Mr. Hodgson and Major Jenkins, the commissioner of Assam; but the poor fellow was speared on the frontier by these savages. The concurrent testimony of the

Assamese, that the Dihong is the Yaru, on its southern course to become the Burrampooter, renders this point as conclusively settled as any resting on mere oral evidence is likely to be.

Lhasa, as all agree, is at a much lower elevation than Jigatzi; and apricots (whose ripe stones Dr. Campbell procured for me) and walnuts are said to ripen there, and the Dama or Himalayan furze (*Cara-gana*), is said to grow there. The Bactrian camel also thrives and breeds at Lhasa, together with a small variety of cow (not the yak), both signs of a much more temperate climate than Jigatzi enjoys. It is, however, a remarkable fact, that there are two tame elephants near the latter city, kept by the Teshoo Lama. They were taken thither through Bhotan; and I have been informed that they have become clothed with long hair, owing to the cold of the climate; but Tchebu Lama contradicted this, adding, that his countrymen were so credulous, that they would believe blankets grew on the elephants' backs, if the Lamas told them so.

A kind of wild ass, the *Equus Hemionus* of Pallas, the untameable Kiang of Tibet, abounds in Dingcham, and we saw several. It resembles the ass more than the horse, from its size, heavy head, small limbs, thin tail, and the stripe over the shoulder. The flesh is eaten and much liked. The Kiang-lah mountains are so named from their being a great resort of this creature. It differs widely from the wild ass of Persia, Sind, and Beloochistan, but is undoubtedly the same as the Siberian animal.

No village or house is seen throughout the extensive

area over which the eye roams from Bhomtso, and the general character of the desolate landscape was similar to that which I have described as seen from Donkia pass. The wild ass grazing with its foal on the sloping downs, the hare bounding over the stony soil, the antelope scouring the sandy flats, and the fox stealing along to his burrow, are all desert and Tartarian types of the animal creation. The shrill whistle of the marmot alone breaks the silence of the scene, recalling the snows of Lapland to the mind; while the kite and raven wheel through the air, with as steady a pinion as if that atmosphere possessed the same power of resistance that it does at the level of the sea. Still higher in the heavens, long black V-shaped trains of wild geese cleave the air, shooting over the glacier-crowned top of Kinchinjow, and winging their flight in one day, perhaps, from the Yaru to the Ganges, over 500 miles of space, and through 22,000 feet of elevation. One plant alone, a yellow lichen (*Borrera*), is found at this height, and that only as a visitor; for, Tartar-like, it migrates over these lofty slopes and ridges, blown about by the violent winds. I found a small beetle on the very top, probably blown up also, for it was a flower-feeder, and seemed benumbed with cold.

Every night that we spent in Tibet, we enjoyed a magnificent display of sunbeams converging to the east, and making a false sun-set. As the sun set, broad purple beams rose from a dark, low, leaden bank on the eastern horizon, and spreading up to the zenith, covered the intervening space: they remained from

fifteen to twenty minutes, fading gradually into the blackness of night. I looked in vain for the beautiful lancet beam of the zodiacal light; its position was obscured by Chomiomo.

On the 18th of October we had another brilliant morning, after a cold night, the temperature having fallen to  $4^{\circ}$ . I took the altitude of Yeumtso by carefully boiling two thermometers, and the result was 16,279 feet, the barometrical observations giving 16,808 feet. Before leaving I removed a thermometer sunk three feet in the gravelly soil, which showed a temperature of  $43^{\circ}$ , which is  $12\frac{3}{4}^{\circ}$  above the mean temperature of the two days we camped here.

This accumulated heat in the upper strata of soil must have a very powerful effect upon vegetation, preventing the delicate rootlets of shrubs from becoming frozen, and preserving vitality in the more fleshy roots, such as those of the large rhubarbs and small orchids, whose spongy cellular tissues would, no doubt, be ruptured by severe frosts. To the burrowing rodents, the hares, marmots, and rats, which abound at 15,000 to 17,000 feet in Tibet, this phenomenon is even more conspicuously important; for were the soil in winter to acquire the mean temperature of the air, it would take very long to heat after the melting of the snow, and indeed the latter phenomenon would be greatly retarded. The rapid development of vegetation after the disappearance of the snow, is no doubt also proximately due to the heat of the soil, quite as much as to the increased strength of the sun's direct rays in lofty regions.

This result, which at first sight appears anomalous, is in accordance with what I have observed elsewhere, namely that the mean temperature of the soil in India, at two or three feet depth, is almost throughout the year above that of the surrounding atmosphere.

Our fires were made of dry yak droppings, which soon burn out with a fierce flame, and much black smoke; they give a disagreeable taste to whatever is cooked with them.

Having sent the coolies forward to Cholamoo lake, we re-ascended Bhomtso, to verify my observations. As on the previous occasion, a violent dry north-west wind blew, peeling the skin from our faces, loading the air with grains of sand, and rendering theodolite observations very uncertain; besides injuring all my instruments, and exposing them to great risk of breakage.

The Tibetan Sepoys did not at all understand our ascending Bhomtso a second time; they ran after Campbell, who was ahead on a stout pony, girding up their long garments, bracing their matchlocks tight over their shoulders, and gasping for breath at every step, the long horns of their muskets bobbing up and down as they toiled amongst the rocks. When I reached the top I found Campbell seated behind a little stone wall which he had raised to keep off the violent wind, and the uncouth warriors in a circle round him, puzzled beyond measure at his admiration of the view. My instruments perplexed them extremely, and in crowding round me, they broke my azimuth compass. They left us to ourselves when the

fire I made to boil the thermometers went out, the wind being intensely cold. I had given my barometer to one of Campbell's men to carry, who not coming up, the latter went to search for him, and found him on the ground quite knocked up and stupified by the cold, and there, if left alone, he would have lain till overtaken by death.

We descended in the afternoon, and it became dark before we reached the Cholamoo lake, where we lost our way amongst glaciers, moraines, and marshes. We expected to have seen the lights of the camp, but were disappointed, and as it was freezing hard, we began to be anxious, and shouted till the echos of our voices against the opposite bank were heard by Tchebu Lama, who met us in great alarm for our safety. Our camp was pitched some way from the shore, on a broad plain, 16,900 feet above the sea. A cold wind descended from Donkia; yet, though more elevated than Yeumtso, the climate of Cholamoo, from being damper and misty, was milder.

The coolies of Dr. Campbell's party were completely knocked up by the rarified air; they had taken a whole day to march here from Yeumtso, scarcely six miles, and could eat no food at night. A Lama of our party offered up prayers to Kinchin-jhow for the recovery of a stout Lepcha lad who showed no signs of animation, and had all the symptoms of serous apoplexy. The Lama perched a saddle on a stone, and burning incense before it, scattered rice to the winds, invoking Kinchin, Donkia, and all the neighbouring peaks. A strong dose of

calomel and jalap, which we poured down the sick lad's throat, contributed materially to the success of these incantations.

All diseases are attributed by the Tibetans to the four elements, who are propitiated accordingly in cases of severe illness. The winds are invoked in cases of affections of the breathing; fire in fevers and inflammations; water in dropsy, and diseases whereby the fluids are affected; and the God of earth when solid organs are diseased, as in liver complaints, rheumatism, &c. Propitiatory offerings are made to the deities of these elements, but never sacrifices.

The Tibetan Sepoys were getting tired of our delays, which so much favoured my operations; but though showing signs of impatience and sulkiness, they behaved well to the last; taking the sick man to the top of the pass on their yaks, and assisting all the party: nothing, however, would induce them to cross into Sikkim, which they considered as "Company's territory."

Before proceeding to the pass, I reascended Donkia to upwards of 19,000 feet, vainly hoping to get a more distant view, and other bearings of the Tibetan mountains. The ascent was over enormous piles of loose rocks split by the frost, and was extremely fatiguing. I reached a peak overhanging a steep precipice, at whose base were small lakes and glaciers, from which flowed several sources of the Lachen, afterwards swelled by the great affluent from Cholamoo lake. A few rocks projected at the very summit, with frozen snow amongst them, beyond which the ice and



precipices rendered it impossible to proceed: but though exposed to the north, there was no perpetual snow in the ordinary acceptation of the term, and an arctic European lichen (*Lecidea oreina*) grew on the top, so faintly discolouring the rocks as hardly to be detected without a magnifying-glass.

I descended obliquely, down a very steep slope, over upwards of a thousand feet of débris, the blocks on which were so loosely poised on one another, that it was necessary to proceed with the utmost circumspection, for I was alone, and a false step would almost certainly have been followed by breaking a leg. The alternate freezing and thawing of rain amongst these masses, must produce a constant downward motion in the whole pile of débris (which was upwards of 2000 feet high), and may account for the otherwise unexplained phenomenon of continuous shoots of angular rocks reposing on very gentle slopes in other places.

The north ascent to the Donkia pass is by a path well selected amongst immense angular masses of rock, and over vast piles of débris. I arrived at the top at 3 P.M., thoroughly fatigued, and found two of my faithful Lepcha lads nestling under a rock with my theodolite and barometers, having been awaiting my arrival in the biting wind for three hours. My pony stood there too, the picture of patience, and laden with minerals. After repeating my observations, I proceeded to Momay Samdong, where I arrived after dusk. I left a small bottle of brandy and some biscuits with the lads, and it was well I did so, for the pony knocked up before reaching Momay, and rather than leave

my bags of stones, they passed the night by the warm flank of the beast, under a rock at 18,000 feet elevation, without other food, fire, or shelter.

I found my companion encamped at Momay, on the spot I had occupied in September; he had had the utmost difficulty in getting his coolies on, as they threw down their light loads in despair, and lying with their faces to the ground, had to be roused from a lethargy that would soon have been followed by death.

We rested for a day at Momay, and on the 20th, attempted to ascend to the Donkia glacier, but were driven back by a heavy snow-storm. The scenery presented a wide difference to that we had left; snow lying at 16,500 feet, whereas immediately to the north of the same mountain there was none at 19,000 feet.

We descended to Yeumtong in a cold drizzle, arriving by sunset and remained through the following day, hoping to explore the lower glacier, on the opposite side of the valley; which, however, the weather entirely prevented. I have before mentioned that in descending in autumn from the drier and more sunny rearward Sikkim valleys, the vegetation is found to be most backward in the lowest and dampest regions. On this occasion, I found asters, grasses, polygonums, and other plants that were withered, brown, and seeding at Momay (14,000 to 15,000 feet), at Yeumtong (12,000 feet) green and unripe; and 2000 feet lower still, at Lachoong, the contrast was even more marked. Thus the short backward spring and summer of the Arctic zone are overtaken by an

early and forward seed-time: so far as regards the effects of mean temperature, the warmer station is in autumn more backward than the colder. This is everywhere recognisable in all natural orders, some of which I have on the same day gathered in ripe fruit at 13,000 feet, and found still in flower at 9000 feet. The brighter skies and more powerful and frequent solar radiation at the greater elevations, account for this apparent inversion of the order of nature.

I was disappointed at finding the rhododendron seeds still immature at Yeumtong, for I was doubtful whether the same kinds might be met with at the Chola pass, which I had yet to visit; besides which, their tardy maturation threatened to delay me for an indefinite period in the country. *Viburnum* and *Lonicera*, however, were ripe and abundant; the fruits of both are considered poisonous in Europe, but here the black berries of a species of the former are eatable and agreeable; as are those of a *Gualtheria*, which are pale blue. Except these, and the cherry, there are no other autumnal fruits above 10,000 feet: brambles, strange as it may appear, do not ascend beyond that elevation in the Sikkim Himalaya, though so abundant below it, both in species and individuals, and though so typical of northern Europe.

At Lachoong we found all the yaks that had been grazing till the end of September at the higher elevations; and the Phipun presented our men with one of a gigantic size, and proportionally old and tough. The Lepchas slaughtered it with arrows, and feasted on the flesh and entrails, singed and fried the skin,

and made soup of the bones, leaving nothing but the horns and hoofs. Having a fine day, they prepared some as jerked meat, cutting it into thin strips, which they dried on the rocks. This is a very common and favourite food in Tibet, and I found it palatable, but on the other hand, the dried saddles of mutton, of which they boast so much, taste so strongly of tallow, that I found it impossible to swallow a morsel of them.

Raw, dried, and split fish are abundantly cured (without salt) in Tibet: they are caught in the Yaru and great lakes of Ramchoo, Dobtah, and Yarbru, and are chiefly carp, and allied fish, which attain a large size. It is one of the most remarkable facts in the zoology of Asia, that no trout or salmon inhabit any of the rivers that débouche into the Indian Ocean (the so-called Himalayan trout is a species of carp). This widely distributed natural order of fish (*Salmonidæ*) is however, found in the Oxus, and in all the rivers of central Asia that flow north and west. The central Himalayan rivers often rise in Tibet from lakes full of fish, but have none (at least during the rains) in that rapid part of their course from 10,000 to 14,000 feet elevation; below that fish abound, but I believe invariably of different species from those found at the sources of the same rivers. The nature of the tropical ocean into which all the Himalayan rivers débouche, is no doubt the proximate cause of the absence of *Salmonidæ*.

We stayed two days at Lachoong, two of my lads being again laid up with fever; one of them had been similarly attacked at the same place nearly two months

before ; the other had been repeatedly ill since June, and at all elevations. Both cases were returns of a fever caught in the low unhealthy valleys some months previously, and excited by exposure and hardship.

I here found that I had lost a thermometer for high temperatures, owing to a hole in the bag in which my attendant carried those of my instruments which were in constant use. It had been last used at the hot springs of the Kinchinhow glacier ; and the poor lad was so concerned at his mishap, that he came to me soon afterwards, with his blanket on his back and a few handfuls of rice in a bag, to make his salaam before setting out to search for it. There was not a single inhabitant between Lachoong and that dreary spot, and strongly against my wish he started, without a companion. Three days afterwards he overtook us at Keadom, radiant with joy at having found the instrument : he had gone up to the hot springs, and vainly sought around them that evening ; then rather than lose the chance of a day-light search on his way back, he had spent the cold October night *in the hot water*, without fire or shelter, at 16,000 feet above the sea. Next morning his search was again fruitless ; and he was returning disconsolate, when he descried the brass case glistening between two planks of the bridge, crossing the river at Momay, over which torrent the instrument was suspended. The Lepchas are generally considered timorous of evil spirits, and especially averse to travelling at night, even in company. However little this gallant lad may have been given to superstition, he was nevertheless a

Lepcha, born in a warm region, and had never faced the cold till he became my servant; and it required a stout heart and an honest one, to spend a night in so awful a solitude as that which reigns around the foot of the Kinchinjhow glacier.

The villagers at Keadom, where we slept on the 26th, were busy cutting the crops of millet, maize, and Amaranthus. A girl who, on my way down the previous month, had observed my curiosity about a singular variety of the maize, had preserved the heads on their ripening, and now brought them to me. The peaches were all gathered, and though only half ripe, were better than Dorjiling produce. A magnificent tree of *Bucklandia*, one of the most beautiful evergreens in Sikkim, grew near this village; it had a trunk twenty-one feet seven inches in girth, at five feet from the ground, and was unbranched for forty feet.\* Ferns and the beautiful air-plant *Cœlogyne Wallichii* grew on its branches with other orchids, while Clematis and Stauntonia climbed the trunk. Such great names (Buckland, Staunton, and Wallich) thus brought before the traveller's notice, never fail to excite lively and pleasing emotions; it is the ignorant and unfeeling alone who can ridicule the association of the names of travellers and naturalists with those of animals and plants.

We arrived at Choongtam (for the fourth time) at

\* This superb tree is a great desideratum in our gardens; I believe it would thrive in the warm west of England. Its wood is brown, and not valuable as timber, but the thick, bright, glossy, evergreen foliage is particularly handsome, and so is the form of the crown.

noon, and took up our quarters in a good house near the temple. The autumn and winter flowering plants now prevailed here, such as Labiatae, which are generally late at this elevation; and grasses, which, though rare in the damp forest regions, are so common on these slopes that I here gathered twenty-six kinds. I spent a day here in order to collect seeds of the superb rhododendrons which I had discovered in May, growing on the hills behind. The ascent was now difficult, from the length of the wiry grass, which rendered the slopes so slippery that it was impossible to ascend without holding on by the tussocks.

A ragged Tibetan mendicant (Phud) was amusing the people: he put on a black mask with cowrie shells for eyes, and danced uncouth figures with a kind of heel and toe shuffle, in excellent time, to rude Tibetan songs of his own; for this he received ample alms, which a little boy collected in a wallet. These vagrants live well upon charity; they bless, curse, and transact little affairs of all kinds up and down the valleys of Sikkim and Tibet; this one dealt in red clay teapots, sheep and puppies.

We found Meepo at Choongtam: I had given him leave (when here last) to go back to the Rajah, and to visit his wife; and he had returned with instructions to conduct me to the Chola and Yakla passes in Eastern Sikkim. These passes, like that of Tunkra, lead over the Chola range to that part of Tibet which is interposed between Sikkim and Bhotan. My road lay past the Rajah's residence, which we considered very fortunate, as apparently affording Campbell an oppor-

tunity of a conference with his highness, for which both he and the Tchebu Lama were most anxious.

On our way down the Lachen-Lachoong, we found



TIBETAN PHUD.

the valley still flooded, and the alders standing with their trunks twelve feet under water; but the shingle dam was now dry and hard: it would probably soften, and be carried away by the first rains of the following year. I left here the temperate flora of northern



Sikkim, tropical forms beginning to appear; of these the nettle tribe were most numerous in the woods. A large grape, with beautiful clusters of round purple berries, was very fair eating; it is not the common vine of Europe, which nevertheless is probably an Himalayan plant, the *Vitis Indica*.

We did not halt at Chakoong, but proceeded to Namgah, a very long and fatiguing march. Thence a short march took us to Singtam, which we reached on the 30th of October. The road by which I had come up was for half the distance obliterated in most parts by landslips, but they were hard and dry, and the leeches were gone.

Bad weather, and Campbell's correspondence with the Sikkim officials, who prevented all communication with the Rajah, detained us here two days, after which we crossed to the Teesta valley, and continued along its east bank.

The great shrubby nettle (*Urtica crenulata*) is common here: this plant, called "Mealum-ma," has broad glossy leaves, and though apparently without stings, is held in so great dread,\* that I had difficulty in getting help to cut it down. I gathered many specimens without allowing any part to touch my skin; still the

\* The stinging hairs are microscopic, and confined to the young shoots, leaf, and flower-stalks. Leschenault de la Tour describes being stung by this nettle on three fingers of his hand only at the Calcutta Botanical Gardens, and the subsequent sneezing and running at the nose, followed by tetanic symptoms and two days' suffering, nor did the effects disappear for nine days. It is a remarkable fact, that the plant stings violently only at this season. I frequently gathered it with impunity on subsequent occasions, and suspected some inaccuracy in my observations; but in Silhet both Dr. Thomson and I experienced the same effects in autumn.

scentless effluvium was so powerful that mucous matter poured from my eyes and nose all the rest of the afternoon in such abundance, that I had to hold my head over a basin for an hour. The sting is very virulent, producing inflammation; and to punish a child with "Mealum-ma" is the severest Lepcha threat. Violent fevers and death have been said to ensue from its sting; but this I very much doubt.



TIBETAN IMPLEMENTS.

TEA-POTS, CUP, AND BRICK OF TEA; KNIFE, TOBACCO-PIPE (ACROSS CHOP-STICKS),  
POUCH, AND FLINT-AND-STEEL.

## CHAPTER XXV.

Journey to the Rajah's residence at Tumloong—Ryott valley—Rajah's house—Tupgain Lama—Lageng nunnery—Phadong Goompa—Phenzong ditto—Lepcha Sepoys—Proceedings at Tumloong—Refused admittance to Rajah—Women's dresses—Meepo's and Tchebu Lama's families—Chapel—Leave for Chola pass—Ryott river—Rungpo, view from—Deputation of Kajeas, &c.—Conference—Laghep—*Cathcartia*—Phieung-goong—Rutto river—Barfonchen—Curling of rhododendron leaf—Woodcock—Chola pass—Tibet guard and Sepoys—Dingpun—Arrival of Sikkim sepoy—Their conduct—Meet Singtam Soubah—Chumanako—We are seized by the Soubah's party—Soubah's conduct—Dingpun Tinli—Treatment of Dr. Campbell—Bound and guarded—Separated from Campbell—Marched to Tumloong—Motives for such conduct—Arrive at Rungpo—At Phadong—Presents from Rajah—Visits of Lama—Of Singtam Soubah—I am cross-questioned by Amlah—Confined with Campbell—Seizure of my coolies—Threats of attacking Dorjiling.

WE started on the 3rd of November for Tumloong (or Sikkim Durbar), Dr. Campbell sending Tchebu Lama forward with letters to announce his approach. A steep ascent through large Rhododendron trees led over a sharp spur, beyond which the whole bay-like valley of the Ryott opened before us, presenting one of the most lovely and fertile landscapes in Sikkim. It is ten miles long, and three or four broad, flanked by lofty mountains, and its head girt by the beautiful snowy range of Chola, from which silvery rills descend

through black Fir-woods, dividing innumerable converging cultivated spurs, and uniting about 2000 feet below us, in a profound gorge. Houses were scattered everywhere amidst purple crops of buck-wheat, green fields of young wheat, yellow millet, broad green plantains, and orange groves.

We crossed spur after spur, often under or over precipices about fifteen hundred feet above the river, proceeding eastwards till we caught sight of the Rajah's house. It was an irregular low stone building of Tibetan architecture, with slanting walls and small windows high up under the broad thatched roof, above which, in the middle, was a Chinese-looking square copper-gilt canopy, with projecting eaves and bells at the corners, surmounted by a ball and square spire. On either gable of the roof was a round-topped cylinder of gilded copper, something like a closed umbrella: this is a very frequent and characteristic Boodhist ornament, and is represented in Turner's plate of the mausoleum of Teshoo Lama; indeed the Rajah's canopy at Tumloong is probably a copy of the upper part of the building there represented, having been built by architects from Teshoo Loombo. It was surrounded by chaits, mendongs, poles with banners, and other religious erections; and though beautifully situated on a flat terrace overlooking the valley, we were much disappointed with its size and appearance.

On the brow of the hill behind was the large red Goompa of the Tugain Lama, the late heir apparent to the temporal and spiritual authority in Sikkim; and near it a nunnery called Lagong, the lady abbess of

which is a daughter of the Rajah, who, with the assistance of sisters, keeps an enormous Mani, or praying-cylinder, revolving perpetually to the prayer of "Om Mani Padmi om." On this side was a similar spur, on which the gilded pinnacles and copper canopy of the Phadong \* goompa gleamed through the trees. At a considerable distance across the head of the valley was still a third goompa, that of Phencong.

We were met by a large party of armed Lepchas, dressed in blue and white striped kirtles, broad loose scarlet jackets, and little bamboo wattle hats lined with talc, and surmounted by a peacock's feather; they escorted us to the village; and then retired.

We encamped a few hundred feet below the Rajah's house, and close by those of Meepo and the Tchebu Lama's family, who are among the oldest and most respectable of Tibetan origin in Sikkim. Crowds came to see us, and many brought presents, with which we were overwhelmed; but we could not help remarking that our cordial greetings were wholly from the older families attached to the Rajah, and from the Lamas; none proceeded from the Dewan's relatives or friends, nor therefore any in the name of the Rajah himself, or of the Sikkim government.

Tchebu Lama vainly used every endeavour to procure for us an audience with his highness; who was surrounded by his councillors, or Amlah, all of whom were adherents of the Dewan, who was in Tibet. Meepo, and the Tchebu Lama, who were ordered to

\* Phadong means Royal, and this temple answers to a chapel royal for the Rajah.

continue in official attendance upon us, shrugged their shoulders, but could suggest no remedy. On the following morning Campbell was visited by many parties, amongst whom were the Lama's family, and



TOKKEBU LAMA.

that of the late Dewan (Ilam Sing), who implored us to send again to announce our presence, and not to dismiss at once the moonshie and his office,\* who

\* It is usual in India for Government officers when about to transact business, to travel with a staff (called office) of native interpreters, clerks, &c., of whom the chief is commonly called moonshie.

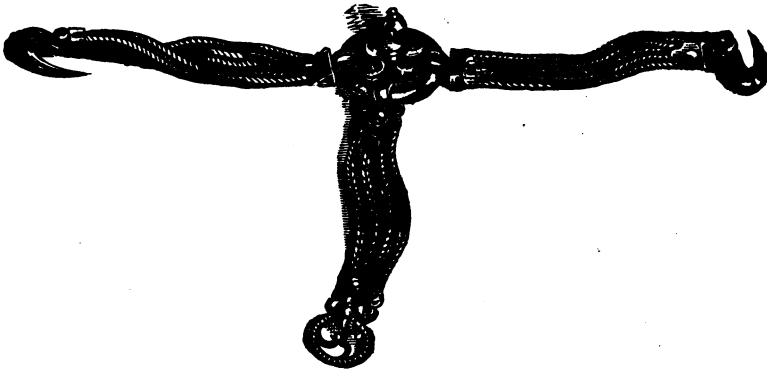
had accompanied us for the purpose of a conference with the Rajah. Their wishes were complied with, and we waited till noon before proceeding.

A gay and animated scene was produced by the concourse of women dressed in their pretty striped and crossed cloaks, who brought tokens of good-will. Amongst them Meepo's wife appeared conspicuous from the large necklaces\* and amulets, corals, and silver filagree work, with which her neck and shoulders were loaded: she wore on her head a red tiara bedizened with seed pearls and large turquoises, and a gold fillet of filagree bosses united by a web of slender chains; her long tails were elaborately plaited, and woven with beads, and her cloak hooked in front by a chain of broad silver links studded with turquoises. White silk scarfs, the emblem of peace and friendship, were thrown over our hands by each party; and rice, eggs, fowls, kids, goats, and Murwa beer, poured in apace, to the great delight of our servants.

We returned two visits of ceremony, one to Meepo's house, a poor cottage, to which we carried presents of chintz dresses for his two little girls; who were busy teasing their hair with cylindrical combs, formed of a single slender joint of bamboo slit all round half-way up into innumerable teeth. Our other visit was paid to the Lama's family, who inhabited a large house not far from the Rajah's. The lower story was an area enclosed by stone walls, into which the cattle, &c., were driven. An outside stone stair led to the upper

\* The lumps of amber forming these were larger than the fist; they are procured in East Tibet, probably from Birmah.

story, where we were received by the head of the family, accompanied by a great concourse of Lamas. He conducted us to a beautiful little oratory at one end of the building, fitted up like a square temple, and



CLASP OF A WOMAN'S CLOAK.

lighted with latticed windows, covered with brilliant and tasteful paintings by Lhassan artists. The beams of the ceiling were supported by octagonal columns painted red, with broad capitals. Everywhere the lotus, the mani, and the chirki (or wheel with three rays, emblematic of the Boodhist Trinity), were introduced; "Om Mani Padmi om" in gilt letters, adorned the projecting end of each beam; and the Chinese "cloud messenger," or winged dragon, floated in azure and gold along the capitals and beams, amongst scrolls and groups of flowers. At one end was a sitting figure of Gorucknath in Lama robes, surrounded by a glory, with mitre and beads; the right hand holding the Dorje, and the forefinger raised in prayer. Around



was a good library of books. More presents were brought here, and tea served.

The route to Chola pass, which crosses the range of that name south of the Chola peak, at the head of this valley, is across the Ryott, and then eastwards along a lofty ridge. Campbell started at noon, and I waited behind with Meepo, who wished me to see the Rajah's dwelling, to which we therefore ascended; but, to my guide's chagrin, we were turned back. We were followed by a messenger, apologising and begging me to return; but I had already descended 1000 feet, and felt no inclination to reascend the hill, especially as there did not appear to be anything worth seeing. Soon after I had overtaken Campbell, he was accosted by an excessively dirty fellow, who desired him to return for a conference with the officials; this was of course declined, but, at the same time, Campbell expressed his readiness to receive them at our halting place.

The Ryott flows in a very tropical gorge 2000 feet above the sea; whence the ascent is very steep to Tumloong, where we took up our quarters at a rest-house called Rungpo (alt. 6008 feet). This road is well kept, and hence onwards is traversed yearly by the Rajah on his way to his summer residence of Choombi, two marches beyond the Chola pass; whither he is taken to avoid the Sikkim rains, which are peculiarly disagreeable to Tibetans. Rungpo commands a most beautiful view northwards, across the valley, of the royal residence, temples, goompas, hamlets, and cultivation, scattered over spurs, which are

studded below with tree-ferns and plantains, and backed by black fir-woods and snowy mountains. In the evening the officers of the court arrived to confer with Campbell; at first there was a proposal of turning us out of the house, in which there was plenty of room, but as we declined to move, except by the Rajah's order, they put up in houses close by.

On the following morning they met us as we were departing for the Chola pass, bringing large presents in the name of the Rajah, and excuses on their and his part for having paid us no respect at Tumloong, saying, that it was not the custom to receive strangers till after they had rested a day, that they were busy preparing a suitable reception, &c.; this was all false, and contrary to etiquette, but there was no use in telling them so. Campbell spoke firmly and kindly to them, and pointed out their incivility and the unfriendly tone of their whole conduct. They then desired Campbell to wait and discuss business affairs with them; this was out of the question, and he assured them that he was ever ready to do so with the Rajah, that he was now (as he had informed his Highness) on his way with me to the Chola and Yakla passes, and that we had, for want of coolies, left some loads behind us, which, if they were really friendly, they would forward. This they did, and so we parted; they (contrary to expectation) making no objection to Campbell's proceeding with me.

A long march up a very steep, narrow ridge took us by a good road to Laghep, a stone resting-house on a very narrow flat. I had abundance of occupation in

gathering rhododendron-seeds, of which I procured twenty-four kinds on this and the following day.

A very remarkable plant, which I had seen in flower in the Lachen valley, grew on the ridge at 7000 feet; it bears a yellow fruit like short cucumbers, full of a soft, sweet, milky pulp, and large black seeds; it belongs to a new genus, allied to *Stauntonia*, of which two Himalayan kinds produce similar, but less agreeable edible fruits. At Laghep, iris was abundant, and a small bushy berberry with oval eatable berries. The north wall of the house (which was in a very exposed spot) was quite bare, while the south was completely clothed with moss and weeds.

A beautiful yellow poppy-like plant grew in clefts at 10,000 feet; it has flowered in England, from seeds which I sent home, and bears the name of *Cathcartia*.\*

We continued, on the following morning, in an easterly direction, up the same narrow steep ridge, to a lofty eminence called Phieung-goong, from being covered with the Phieung, or small bamboo. Hence we followed an oblique descent to the bed of the Rutto river, through thick woods of silver-fir and rhododendron, and halted at Barfonchen, a stone hut in the forest. Some yaks were grazing in the vicinity, and from their herdsman we learnt that the

\* The name was given in honour of the memory of my friend, the late J. F. Cathcart, Esq., of the Bengal Civil Service. This gentleman was devoted to the pursuit of botany, and caused a magnificent series of drawings of Dorjiling plants to be made by native artists during his residence there. Mr. Cathcart, after the expiration of his Indian service, returned to Europe, and died at Lausanne on his way to England.

Dewan was at Choombi, on the road to Yakla: he had kept wholly out of the way during the summer, directing every unfriendly action to be pursued towards myself and the government by the Sikkim officers, consisting of his brothers and relatives, whom he left at Tumloong.

The night was brilliant and starlight; the minimum thermometer fell to  $27^{\circ}$ , a strong north-east wind blew down the valley, and there was a thick hoar-frost, with which the black yaks were drolly powdered. The broad leaves of the rhododendrons were curled, from the expansion of the frozen fluids in the layer of cells on the upper surface of the leaf, which is exposed to the greatest cold of radiation. The sun restores them a little, but as winter advances they become irrecoverably curled, and droop at the ends of the branches.

We left Barfonchen on the 7th November, and ascended the river, near which we put up a woodcock. Emerging from the woods the mountains became bleak, bare, and stony. At 13,000 feet the ground was covered with ice, and all the streams were frozen. Crossing several rocky ledges, behind which were small lakes, a gradual ascent led to the summit of the Chola pass, a broad low depression, 14,925 feet above the sea, wholly bare of snow.

Campbell had preceded me, and I found him conversing with some Tibetans, who told him that there was no road hence to Yakla, and that we should not be permitted to go to Choombi. As a Chinese guard was posted in the neighbourhood, he accom-

panied one of the Tibetans to see the commandant, whilst I remained taking observations.

In about an hour Meepo and some of my people came up and asked for Campbell, for whom the Tchebu Lama was waiting below : the Lama had remained at Rungpo, endeavouring to put matters on a better footing with the Sikkim officers. Wishing to see the Tibet guard, I accompanied the two remaining Tibetans down a steep valley with cliffs on either hand, for several hundred feet, when I was overtaken by some Sikkim sepoy in red jackets, who wanted to turn me back forcibly : I was at a loss to understand their conduct, and appealed to the Tibetan sepoy, who caused them to desist. About 1000 feet down I found Campbell, with a body of about ninety Tibetans, a few of whom were armed with matchlocks, and the rest with bows and arrows. They were commanded by a Dingpun, a short swarthy man, with a flat-crowned cap with floss-silk hanging all round, and a green glass button in front ; he wore a loose scarlet jacket, broadly edged with black velvet, and having great brass buttons of the Indian naval uniform ; his subaltern was similarly dressed, but his buttons were those of the 44th Bengal Infantry. The commandant having heard of our wish to go round by Choombi, told Campbell that he had come purposely to inform him that there was no road that way to Yakla ; he was very polite, ordering his party to rise and salute me when I arrived, and doing the same when we both left.

On our return we were accompanied by the Dingpun of the Tibetans and a few of his people, and were soon

met by more Sikkim sepoy, who said they were sent from the Durbar, to bring Campbell back to transact business ; they behaved very rudely, and when still half a mile from the Sikkim frontier, jostled him and feigned to draw their knives, and one of them pointed a spear-headed bow to his breast. Campbell defended himself with a stick, and remonstrated with them on their rudeness ; and I, who had nothing but a barometer in my hand, called up the Tibetans. The Dingpun came instantly, and driving the Sikkim people forward, escorted us to the frontier, where he took an inscribed board from the chait, and showed us the great vermilion seal of the Emperor of China (or more probably of the Lhassan authorities) on one side, and two small brown ones of the Sikkim Rajah on the other ; and giving us to understand that here his jurisdiction ceased, he again saluted and left us.

On descending, I was surprised to meet the Singtam Soubah, whom I had not seen since leaving Tungu ; he was seated on a rock, and I remarked that he looked ashy pale and haggard, and that he salaamed to me only, and not to Campbell ; and that Tchebu Lama, who was with him, seemed very uncomfortable. The Soubah wanted Campbell to stop for a conference, which at such a time, and in such a wind, was impossible ; so he followed us to Chumanako, where we proposed to pass the night.

A great party of Sikkim Bhoteas had assembled here, all strangers to me : I certainly thought the course unusually large, and the previous conduct to Campbell strange, rude, and quite unintelligible,

especially before the Tibetans. But the Bhoteas were always a queer, and often insolent people, whom I was long ago tired of trying to understand, and they might have wanted to show off before their neighbours; and such was the confidence with which my long travels amongst them had inspired me, that the possibility of danger or violence never entered my head.

We went into the hut, and were resting ourselves on a log at one end of it, when, the evening being very cold, the people crowded in; on which Campbell went out, saying, that we had better leave the hut to them, and that he would see the tents pitched. He had scarcely left, when I heard him calling loudly to me, "Hooker! Hooker! the savages are murdering me!" I rushed to the door, and caught sight of him striking out with his fists, and struggling violently; being tall and powerful, he had already prostrated a few, but a host of men bore him down, and appeared to be trampling on him; at the same moment I was myself seized by eight men, who forced me back into the hut, and down on the log, where they held me in a sitting posture, pressing me against the wall; here I spent a few moments of agony, as I heard my friend's stifled cries grow fainter and fainter. I struggled but little, and that only at first, for at least five-and-twenty men crowded round and laid their hands upon me, rendering any effort to move useless; they were, however, neither angry nor violent, and signed to me to keep quiet. I retained my presence of mind, and felt comfort in remembering that I saw no knives used by the party who fell on Campbell, and that if their

intentions had been murderous, an arrow would have been the more sure and less troublesome weapon. It was evident that the whole animus was directed against Campbell, and though at first alarmed on my own account also, all the inferences which, with the rapidity of lightning my mind involuntarily drew, were favourable.

After a few minutes, three persons came into the hut, and seated themselves opposite to me: I only recognised two of them; namely, the Singtam Soubah; pale, trembling like a leaf, and with great drops of sweat trickling from his greasy brow; and the Tchebu Lama, stolid, but evidently under restraint, and frightened. The former ordered the men to leave hold of me, and to stand guard on either side, and, in a violently agitated manner, he endeavoured to explain that Campbell was a prisoner by the orders of the Rajah, who was dissatisfied with his conduct as a government officer, during the past twelve years; and that he was to be taken to the Durbar and confined till the supreme government at Calcutta should confirm such articles as he should be compelled to subscribe to; he also wanted to know from me how Campbell would be likely to behave. I refused to answer any questions till I should be informed why I was myself made prisoner; on which he went away, leaving me still guarded. My own Sirdar then explained that Campbell had been knocked down, tied hand and foot, and taken to his tent, and that all his coolies were also bound, our captors claiming them as Sikkimites, and subjects of the Rajah.

Shortly afterwards the three returned, the Soubah



looking more spectral than ever, and still more violently agitated; and I thought I perceived that whatever were his plans, he had failed in them. He asked me what view the Governor-General would take of this proceeding? and receiving no answer, he went off with the Tchebu Lama, and left me with the third individual. The latter looked steadily at me for some time, and then asked if I did not know him. I said I did not, when he gave his name as Dingpun Tinli, and I recognised in him one of the men whom the Dewan had sent to conduct us to the top of Mainom the previous year. This opened my eyes a good deal, for he was known to be a right-hand man of the Dewan's, and had a short time before been convicted of kidnapping a Brahmin girl from Nepal,\* and had vowed vengeance against Campbell for the duty he had performed in bringing him to punishment.

I was soon asked to go to my tent, which I found pitched close by; they refused me permission to see my fellow-prisoner, or to be near him, but allowed me to hang up my instruments, and arrange my collections. My guards were frequently changed during the night, Lepchas often taking a turn; they repeatedly assured me that there was no complaint or ill-feeling against me, that the better classes in Sikkim would be greatly ashamed of the whole affair, that Tchebu Lama was equally a prisoner, and that the grievances

\* This act, as I have mentioned, was not only a violation of the British treaty, but an outrage on the religion of Nepal. Jung Bahadoor demanded instant restitution, which Campbell effected; thus incurring the Dingpun's wrath, who lost, besides his prize, a good deal of money which the escapade cost him.

against Campbell were of a political nature, but what they were they did not know.

The night was very cold (thermometer 26°), and two inches of snow fell. I took as many of my party as I could into my tent, they having no shelter fit for such an elevation (12,590 feet) at this season. Through the connivance of some of the people, I managed to correspond with Campbell, who afterwards gave me the following account of the treatment he had received. He stated that on leaving the hut, he had been met by Meepo, who told him the Soubah had ordered his being turned out. A crowd of sepoys then fell on him and brought him to the ground, knocked him on the head, trampled on him, and pressed his neck down to his chest as he lay, as if endeavouring to break it. His feet were tied, and his arms pinioned behind, the wrist of the right hand being bound to the left arm above the elbow; the cords were then doubled, and he was violently shaken. The Singtam Soubah directed all this, which was performed chiefly by the Dingpun Tinli and Jongpun Sangabadoo.\* After this the Soubah came to me, as I have related; and returning, had Campbell brought bound before him, and asked him, through Tchebu Lama, if he would write from dictation. The Soubah was violent, excited, and nervous; Tchebu Lama scared. Campbell answered, that if they continued torturing him (which was done by twisting the cords round his wrists by a bamboo-wrench), he might say or do anything, but that his

\* This was the other man sent with us to Mainom, by the Dewan, in the previous December.

government would not confirm any acts thus extorted. The Soubah became still more violent, shook his bow in Campbell's face, and drawing his hand significantly across his throat, repeated his questions, adding others, enquiring why he had refused to receive the Lasso Kajee as Vakeel, &c. The Soubah's people, meanwhile, gradually slunk away, seeing which he left Campbell, who was taken to his tent.

Early next morning Meepo was sent by the Soubah, to ask whether I would go to Yakla pass, or return to Dorjiling, and to say that the Rajah's orders had been very strict that I was not to be molested, and that I might proceed to whatever passes I wished to visit, whilst Campbell was to be taken back to the Durbar, to transact business. I was obliged to call upon the Soubah and Dingpun to explain their conduct of the previous day, which they declared arose from no ill-feeling, but simply from their fear of my interfering in Campbell's behalf; they could not see what reason I had to complain, so long as I was neither hurt nor bound. I tried in vain to explain to them that they could not so play fast and loose with a British subject, and insisted that if they really considered me free, they should place me with Campbell, under whose protection I considered myself, he being still the Governor-General's agent.

Much discussion followed this: Meepo urged me to go on to Yakla, and leave these bad people; and the Soubah and Dingpun, who had exceeded their orders in laying hands on me, both wished me away. My course was, however, clear as to the propriety of

keeping as close to Campbell as I was allowed, so they reluctantly agreed to take me with him to the Durbar.

Tchebu Lama came to me soon afterwards, looking as stolid as ever, but with a gulping in his throat; he alone was glad I was going with them, and implored me to counsel Campbell not to irritate the officials by a refusal to accede to their dictates, in which case his life might be the forfeit. As to himself, the opposite faction had now got the mastery, there was nothing for it but to succumb, and his throat would surely be cut. I endeavoured to comfort him with the assurance that they dared not hurt Campbell, and that this conduct of a party of ruffians, influenced by the Dewan and their own private pique, did not represent his Rajah's feelings and wishes, as he himself knew; but the poor fellow was utterly unnerved, and shaking hands warmly with his eyes full of tears, he took his leave.

We were summoned by the Dingpun to march at 10 A.M.: I demanded an interview with Campbell first, which was refused; but I felt myself pretty safe, and insisting upon it, he was brought to me. He was sadly bruised about the head, arms, and wrists, walked very lame, and had a black eye to boot, but was looking stout and confident.

I may here mention that seizing the representative of a neighbouring power, and confining him till he shall have become amenable to terms, is a common practice along the Tibet, Sikkim, and Bhotan frontiers. It had been resorted to in 1837, by the Bhotanese, under the instructions of the Paro Pilo, who waylaid the Sikkim

Rajah when still in Tibet, on his return from Jigatzi, and beleaguered him for two months, endeavouring to bring him to their terms about some border dispute; on this occasion the Rajah applied to the British government for assistance, which was refused; and he was ultimately rescued by a Tibetan force.

In the present case the Dewan had issued orders that Campbell was to be confined at Tumloong till he himself should arrive there; and the Rajah was kept in ignorance of the affair. The Sepoys who met us on our approach to Tumloong on the 3rd of November, were, I suspect, originally sent for the purpose; and I think that the officials who followed us to Rungpo had the same object. Their own extreme timidity, and the general good-feeling in the country towards Campbell prevented its execution before, and, as a last resource, they selected the Singtam Soubah and Dingpun Tinli for the office, as being personally hostile to him. Meanwhile, the Dewan being in Tibet, and knowing that we were about to visit the frontier, for which I had full permission and an escort, sent up the Tibetan guard, hoping to embroil them in the affair; in this he failed, and it drew upon him the anger of the Lhasan authorities.\* The Soubah, in

\* In the following summer (1850), when the Rajah, Dewan, and Soubah repaired to Choombi, the Lhasan authorities sent a Commissioner to inquire into the affair, understanding that the Dewan had attempted to embroil the Tibetans in it. The commissioner asked the Rajah why he had committed such an outrage on the representative of the British government, under whose protection he was; thus losing his territory, and bringing English troops so near the Tibet frontier. The Rajah answered that he never did anything of the kind; that he was old and infirm, and

endeavouring to extort a new treaty by force, and the Dingpun, who had his own revenge to gratify, exceeded their instructions in using violence towards Campbell, whom the Dewan ordered should be simply taken and confined; they were consequently disgraced, long before we were released, and the failure of the stratagem thrown upon their shoulders.

During the march down to Laghep, Campbell was treated by the Dingpun's men with great rudeness: I kept as near as I was allowed, quietly gathering rhododendron-seeds by the way. At the camping-ground we were again separated, at which I remonstrated with the Dingpun, also complaining of his people's insolent behaviour towards their prisoner, which he promised should be discontinued.

The next day we reached Rungpo, where we halted for further instructions: our tents were placed apart, but we managed to correspond by stealth. On the 10th of November, we were conducted to Tumloong: a pony was brought for me, but I refused it, on seeing that Campbell was treated with great indignity, and obliged

unable to transact all his affairs; that the mischief had arisen out of the acts and ignorance of others; and finally he begged the Commissioner to investigate the whole affair, and satisfy himself about it. During the inquiry that followed, the Dewan threw all the blame on the Tibetans, who, he said, were alone implicated: this assertion was easily disproved, and on the conclusion of the inquiry the Commissioner railed vehemently at the Dewan, saying:—"You tried to put this business on the people of my country; it is an abominable lie. You did it yourselves, and no one else. The Company is a great monarchy; you insulted it, and it has taken its revenge. If you, or any other Tibetan, ever again cause a rupture with the English, you shall be taken with a rope round your neck to Peking, there to undergo the just punishment of your offence under the sentence of the mighty Emperor."

to follow at the tail of the mule ridden by the Dingpun, who thus marched him in triumph up to the village.

I was taken to a house at Phadong, and my fellow prisoner was confined in another at some distance to the eastward, a stone's throw below the Rajah's; and thrust into a little cage-like room. I was soon visited by an old Lama, who assured me that we were both perfectly safe, but that there were many grievances against Campbell. The Soubah arrived shortly after, bringing me compliments, nominally in the Rajah's name, and a substantial present, consisting of a large cow, sheep, fowls, a brick of tea, bags of rice, flour, butter, eggs, and a profusion of vegetables. I refused to take them on the friendly terms on which they were brought, and only accepted them as provisions during my detention. I remonstrated again about our separation, and warned the Soubah of the inevitable consequence of this outrage upon the representative of a friendly power, travelling under the authority of his own government, unarmed and without escort: he was greatly perplexed, and assured me that Campbell's detention was only temporary, because he had not given satisfaction to the Rajah, and as the latter could not get answers to his demands from Calcutta in less than a month, it was determined to keep him till then; but to send me to Dorjiling. He returned in the evening to tell me that Campbell's men (with the exception only of those who were natives of Nepal\*)

\* These people stood in far greater fear of the Nepalese than of the English, and the reason is obvious: the former allow no infraction of their treaties to pass unnoticed, whereas we had permitted every article of our treaty to be contravened.

had been seized because they were runaway slaves from Sikkim ; but that I need not alarm myself, for mine should be untouched.

The hut being small, and intolerably dirty, I pitched my tent close by, and lived in it for seven days : I was not guarded, but so closely watched, that I could not go out for the most trifling purpose, except under surveillance. They were evidently afraid of my escaping ; I was however treated with civility, but forbidden to communicate either with Campbell or with Dorjiling.

The Soubah frequently visited me, always protesting I was no prisoner, that Campbell's seizure was a very trifling affair, and the violence employed all a mistake.

He always brought presents, and tried to sound me about the government at Calcutta. On the 12th he paid his last visit, looking wofully dejected, being out of favour at court, and dismissed to his home : he referred me to Meepo for all future communications to the Rajah, and bade me a most cordial farewell, which I regretted being unable to return with any show of kind feeling. Poor fellow ! he had staked his last, and lost it, when he undertook to seize the agent of the most powerful government in the east, and to reduce him to the condition of a tool of the Dewan. Despite the many obstructions he had placed in my way, we had not fallen out since July ; we had been constant companions, and though at issue, never at enmity. I had impeached him, and my grievances had been forwarded to the Rajah with a demand for his punishment, but he never seemed to owe me a



grudge for that, knowing the Rajah's impotence as compared with the power of the Dewan whom he served; and, in common with all his party, presuming on the unwillingness of the British government to punish.

On the 13th of November I was hurriedly summoned by Meepo to the Phadong temple, where I was interrogated by the Amlah, as the Rajah's councillors (in this instance the Dewan's adherents) are called. I found four Chinese mats placed on a stone bench, on one of which I was requested to seat myself, the others being occupied by the Dewan's elder brother, a younger brother of the Gangtok Kajee (a man of some wealth), and an old Lama: the conference took place in the open air, amongst an immense crowd of Lamas, men, women, and children.

I took the initiative (as I made a point of doing on all such occasions) and demanded proper interpreters, which were refused; and the Amlah began a rambling interrogatory in Tibetan, through my Lepcha attendant, who spoke very little Tibetan or Hindostanee, and my half-caste servant, who spoke as little English. The Dewan's brother was very nervously counting his beads, and never raised his eyes while I kept mine steadily upon him.

He suggested most of the queries, every one of which took several minutes, as he was constantly interrupted by the Kajee, who was very fat and stupid: the Lama scarcely spoke, and the bystanders never. My connection with the Indian government was first enquired into; next they came to political matters,

upon which I declined entering; but I gathered that their object was to oblige Campbell to accept the Lassoo Kajee as Vakeel, to alter the slavery laws, to draw a new boundary line with Nepal, to institute direct communication between themselves and the Governor-General,\* and to engage that there should be no trade or communication between Sikkim and India, except through the Dewan: all of these subjects related to the terms of the original treaty between the Rajah and the Indian government. They told me they had sent these proposals to the government through Dorjiling,† but had received no acknowledgment from the latter place, and they wanted to know the probable result at Calcutta. As the only answer I could give might irritate them, I again declined giving any. Lastly, they assured me that no blame was imputed to myself, that on the contrary I had been travelling under the Rajah's protection, who rejoiced in my success, that I might have visited Yakla pass as I had intended doing, but that preferring to accompany my friend, they had allowed me to do so, and that I might now either join

\* They were prompted to demand this by an unfortunate oversight that had occurred at Calcutta some years before. Representatives of the Sikkim court repaired to that capital, and though unaccredited by the Governor-General's agent at Dorjiling, were (in the absence of the Governor-General) received by the president of the council in open court. The effect was of course to reduce the Governor-General's agent at Dorjiling to a cipher.

† These letters had arrived at Dorjiling; but being written in Tibetan, and containing matters into which no one but Campbell could enter, they were laid on one side till his return. The interpreter did not read the last line, which stated that Dr. Campbell was *detained* at Tumloong till answers were received, and the facts of our capture and imprisonment consequently remained unknown for several weeks.

him, or continue to live in my tent : of course I joyfully accepted the former proposal. After being refused permission to send a letter to Dorjiling, except I would write in a character which they could read, I asked if they had anything more to say, and being answered in the negative, I was taken by Meepo to Campbell, heartily glad to end a conference which had lasted for an hour and a half.

I found my friend in good health and spirits, strictly guarded in a small thatched hut, of bamboo, wattle and clay : the situation was pretty, and commanded a view of the Ryott valley and the snowy mountains ; there were some picturesque chaits hard by, and a blacksmith's forge. Our walks were confined to a few steps in front of the hut, and included a puddle and a spring of water. We had one dark room with a small window, and a fire in the middle on a stone ; we slept in a narrow apartment behind it, which was the cage in which Campbell had been at first confined, and which exactly admitted us both, lying on the floor. Two or three Sepoys occupied an adjoining room, and had a peep-hole through the partition-wall.

My gratification at our being placed together was damped by the seizure of all my faithful attendants except my own servant, and one who was a Nepalese : the rest were bound, and placed in the stocks and close confinement, charged with being Sikkim people who had no authority to take service in Dorjiling. On the contrary they were all registered as British subjects, and had during my travels been recognised as such by the Rajah and all the authorities. Three times the

Soubah and others had voluntarily assured me that my person and people were inviolate ; nor was there any cause for this outrage but the fear of their escaping with news to Dorjiling, and possibly a feeling of irritation amongst the authorities at the failure of their schemes. Meanwhile we were not allowed to write, and we heard that the bag of letters which we had sent before our capture had been seized and burnt. Campbell greatly feared that they would threaten Dorjiling with a night attack,\* as we heard that the Lassoo Kajee was stationed at Namtchi with a party for that purpose, and all communication cut off, except through him.

\* Threats of sacking Dorjiling had on several previous occasions been made by the Dewan, to the too great alarm of the inhabitants, who were ignorant of the timid and pacific disposition of the Lepchas, and of the fact that there are not fifty muskets in the country, nor twenty men able to use them. On this occasion the threats were coupled with the report that we were murdered, and that the Rajah had asked for 50,000 Tibetan soldiers, who were being marched twenty-five days' journey over passes 15,000 feet high, and deep in snow, and were coming to drive the English out of Sikkim ! I need hardly observe that the Tibetans (who have repeatedly refused to interfere on this side the snows) had no hand in the matter, or that, supposing they could collect that number of men in all Tibet, it would be impossible to feed them for a week, there or in Sikkim. Such reports unfortunately spread a panic in Dorjiling : the guards were called in from all the outposts, and the ladies huddled into one house, whilst the men stood on the defensive ; to the great amusement of the officials at Tumloong, whose insolence to us increased proportionally.

## CHAPTER XXVI.

Dr. Campbell is ordered to appear at Durbar—Lamas called to council—Threats—Scarcity of food—Arrival of Dewan—Our jailor, Thoba-sing—Temperature, &c., at Tumloong—Services of Goompas—Lepcha girl—Jews' harp—Terror of servants—Ilam-sing's family—Interview with Dewan—Remonstrances—Dewan feigns sickness—Lord Dalhousie's letter to Rajah—Treatment of Indo-Chinese—Concourse of Lamas—Visit of Tchebu Lama—Close confinement—Dr. Campbell's illness—Conference with Amlah—Relaxation of confinement—Pemiongchi Lama's intercession—Escape of Nimbo—Presents from Rajah, Ranees and people—Protestations of friendship—Mr. Lushington sent to Dorjiling—Leave Tumloong—Cordial farewell—Dewan's merchandise—Gangtok Kajee—Dewan's pomp—Governor-General's letter—Dikkeeling—Suspicion of poison—Dinner and pills—Tobacco—Bhotanese colony—Katong-ghat on Teesta—Wild lemons—Sepoy's insolence—Dewan alarmed—View of Dorjiling—Threats of a rescue—Fears of our escape—Tibet flutes—Negociate our release—Arrival at Dorjiling—Dr. Thomson joins me—Movement of troops at Dorjiling—Seizure of Rajah's Terai property.

SINCE his confinement, Dr. Campbell had been desired to attend the Durbar for the purpose of transacting business, but had refused to go, except by compulsion, considering that in the excited state of the authorities, amongst whom there was not one person of responsibility or judgment, his presence would not only be useless, but he might be exposed to further insult, or possibly violence.

On the 15th of November we were informed that the

Dewan was on his way from Tibet: of this we were glad, for knave as he was, we had hitherto considered him to possess sense and understanding. His agents were beginning to find out their mistake, and summoned to council the principal Lamas and Kajeos of the country, who, to a man, repudiated the proceedings, and refused to attend. Our captors were extremely anxious to induce us to write letters to Dorjiling, and sent spies of all kinds to offer us facilities for secret correspondence. The simplicity and clumsiness with which these artifices were attempted would have been ludicrous under other circumstances; while the threat of murdering Campbell only alarmed us inasmuch as it came from people too stupid to be trusted. We made out that all Sikkim people were excluded from Dorjiling, and the officials consequently could not conceal their anxiety to know what had befallen their letters to government.

Meanwhile we were but scantily fed, and our imprisoned coolies got nothing at all. Our guards were supplied with a handful of rice or meal as the day's allowance; they were consequently grumbling,\* and were daily reduced in number. The supplies of rice

\* The Rajah has no standing army; not even a body-guard, and these men were summoned to Tumloong before our arrival; they had no arms and received no pay, but were fed when called out on duty. There is no store for grain, no bazaar or market, in any part of the country, each family growing barely enough for its own wants; consequently Sikkim could not stand on the defensive for a week. The Rajah receives his supply of grain in annual contributions from the peasantry, who thus pay a rent in kind, which varies from little to nothing, according to the year, &c. He had also property of his own in the Terai, but the slender proceeds only enabled him to trade with Tibet for tea, &c.

from the Terai, beyond Dorjiling, were cut off by the interruption of communication, and the authorities evidently could not hold us long at this rate : we sent up complaints, but of course received no answer.

The Dewan arrived one afternoon in great state,



RAJAH'S RESIDENCE, AND THE HUT ASSIGNED TO US. ARRIVAL OF THE DEWAN.

carried in an English chair, given him by Campbell some years before, habited in a blue silk cloak lined with lambskin, and wearing an enormous straw hat with a red tassel, and black velvet butterflies on the flapping brim. He was accompanied by a household of women, who were laden with ornaments, and wore

boots, and sat astride on ponies; many Lamas were also with him, one of whom wore a broad Chinese hat covered with polished copper foil. Half a dozen Sepoys with matchlocks preceded him, and on approaching Tumloong bawled out his titles, dignities, &c., as was formerly the custom in England.

At Dorjiling our seizure was still unknown: our letters were brought to us, but we were not allowed to answer them. Now that the Dewan had arrived, we hoped to come to a speedy explanation with him, but he shammed sickness, and sent no answer to our messages, if indeed he received them. Our guards were reduced to one sepoy with a knife, who was friendly; and a dirty, cross-eyed fellow named Thobasing, who, with the exception of Tchebu Lama, was the only Bhotea about the Durbar who could speak Hindostanee, and who did it very imperfectly: he was our attendant and spy, the most bare-faced liar I ever met with, even in the east; and as cringing and obsequious when alone with us, as he was to his masters on other occasions, when he never failed to show off his authority over us in an offensive manner. Though he was the most disagreeable fellow we were ever thrown in contact with, I do not think he was selected for that reason, but solely from his possessing a few words of Hindostanee, and his presumed capability of therefore playing the spy.

The weather was generally drizzling or rainy, and we were getting very tired of our captivity; but I beguiled the time by carefully keeping my meteorological register, and by reducing many of my previous



observations. Each morning we were awakened at daybreak by the prolonged echos of the conchs, trumpets, and cymbals, beaten by the priests before the many temples in the valley: wild and pleasing sounds, often followed by their choral chants. After dark we sat over the fire, generally in company with a little Lepcha girl, who was appointed to keep us in fire-wood, and who sat watching our movements with childish curiosity. Dolly, as we christened her, was a quick child and a kind one, intolerably dirty, but very entertaining from her powers of mimicry. She was fond of hearing me whistle airs, and procured me a Tibetan Jews'-harp,\* with which, and coarse tobacco,



TIBET-PIPE, AND TINDER-POUCH WITH STEEL ATTACHED.

which I smoked out of a Tibetan brass pipe, I wiled away the long evenings, whilst my cheerful companion

\* This instrument (which is common in Tibet) is identical with the European, except that the tongue is produced behind the bow, in a strong steel spike, by which the instrument is held firmer to the mouth.

amused himself with an old harmonicon, to the enchantment of Dolly and our guards and neighbours.

The messengers from Dorjiling were kept in utter ignorance of our confinement till their arrival at Tum-loong, when they were cross-questioned, and finally sent to us. They gradually became too numerous, there being only one apartment for ourselves, and such of our servants as were not imprisoned elsewhere. Some of them were frightened out of their senses, and the state of abject fear and trembling in which one Limboo arrived, and continued for nearly a week, was quite distressing\* to every one except Dolly, who mimicked him in a manner that was irresistibly ludicrous. Whether he had been beaten or threatened we could not make out, nor whether he had heard of some dark fate impending over ourselves—a suspicion which would force itself upon our minds; especially as Thoba-sing had coolly suggested to the Amlah the despatching of Campbell, as the shortest way of getting out of the scrape! We were also ignorant whether any steps were being taken at Dorjiling for our release, which we felt satisfied must follow any active measures against these bullying cowards, though they themselves frequently warned us that we should be thrown into the Teesta if any such were pursued.

\* It amounted to a complete prostration of bodily and mental powers: the man trembled and started when spoken to, or at any noise, a cold sweat constantly bedewed his forehead, and he continued in this state for eight days. No kindness on Campbell's part could rouse him to give any intelligible account of his fears or their cause. His companions said he had lost his goroo, *i.e.*, his charm, which the priest gives him while yet a child, and which he renews or gets re-sanctified as occasion requires. To us the circumstance was extremely painful.

So long as our money lasted, we bought food, for the Durbar had none to give; and latterly my ever charitable companion fed our guards, including Dolly and Thoba-sing, in pity to their pinched condition. Several families sent us small presents by night, especially that of the late estimable Dewan, Nam-sing, whose widow and daughters lived close by, and never failed to express in secret their sympathy and good feeling. Tchebu Lama's and Meepo's families were equally forward in their desire to serve us; but they were marked men, and could only communicate by stealth.

Our coolies were released on the 18th, more than half starved, but the Sirdars were still kept in chains or the stocks: some were sent back to Dorjiling, and the British subjects billeted off amongst the villagers, and variously employed by the Dewan: one lad was set to collect the long leaves of a plant which yield a sweet juice, and were chopped up and mixed with tobacco for the Dewan's hookah.

*November 20th.*—The Dewan, we heard this day, ignored all the late proceedings, professing to be enraged with his brother and the officials, and refusing to meddle in the matter. This was no doubt a pretence: we had sent repeatedly for an explanation with himself or the Rajah, from which he excused himself on the plea of ill health, till this day, when he apprized us that he would meet Campbell, and a cotton tent was pitched for the purpose.

We went about noon, and were received with great politeness and shaking of hands by the Dewan, the young Gangtok Kajee, and the old monk who had

been present at my previous examination. Tchebu Lama's brother was also there, as a member of the court, lately taken into favour; while Tchebu himself acted as interpreter, the Dewan speaking only Tibetan. They all sat cross-legged on a bamboo bench on one side, and we on chairs opposite them: walnuts and sweetmeats were brought us, and a small present in the Rajah's name, consisting of rice, flour, and butter.

The Dewan opened the conversation both in this and another conference, which took place on the 22nd, by requesting Campbell to state his reasons for having desired these interviews. Neither he nor the Sikkim officers seemed to have the smallest idea of the nature and consequences of the acts they had committed, and they therefore anxiously sought information as to the view that would be taken of them by the British Government. They could not see why Campbell should not transact business with them in his present condition, and wanted him to be the medium of communication between themselves and Calcutta. He, however, confined himself to pointing out his own views of the following subjects:—1. The seizing and imprisoning of the agent of a friendly power, travelling unarmed and without escort, under the formal protection of the Rajah, and with the authority of his own government. 2. The aggravation of this act of the Amlah, by our present detention under the Dewan's authority. 3. The chance of collision, and the disastrous consequences of a war, for which they had no preparation of any kind. 4. The impossibility of the supreme

government paying any attention to their letters so long as we were illegally detained.

All this sank deep into the Dewan's heart: he answered "You have spoken truth, and I will submit it all to the Rajah;" but at the same time he urged that there was nothing dishonourable in the imprisonment, and that the original violence being all a mistake, it should be overlooked by both parties. We parted on good terms, and heard shortly after the second conference that our release was promised and arranged: when a communication \* from Dorjiling changed their plans, the Dewan conveniently fell sick on the spot, and we were thrown back again.

In the meantime, however, we were allowed to write to our friends, and to receive money and food, of which we stood in great need. I transmitted a private account of the whole affair to the Governor-General, who was unfortunately at Bombay, but to whose prompt and vigorous measures we were finally indebted for our release. His lordship expedited a despatch to the Rajah, such as the latter was accustomed to receive from Nepal, Bhotan, or Lhasa, and such as alone commands attention from these half-civilized Indo-Chinese, who measure power by the firmness of tone adopted towards them; and who, whether in Sikkim,

\* I need scarcely say that every step was taken at Dorjiling for our release that the most anxious solicitude for our safety could suggest; but the first communication to the Rajah, though it pointed out the heinous nature of his offence, was, through a natural fear of exasperating our captors, couched in very moderate language. The particulars of our seizure, and the reasons for it, and for our further detention, were unknown at Dorjiling, or a very different line of policy would have been pursued.

Birmah, Siam, Bhotan, or China, have too long been accustomed to see every article of our treaties contravened, with no worse consequences than a protest or threat, which is never carried into execution till some fatal step calls forth the dormant power of the British Government.\*

The end of the month arrived without bringing any prospect of our release, whilst we were harassed by false reports of all kinds. The Dewan went on the 25th to a hot bath, a few hundred feet down the hill ; he was led past our hut, his burly frame tottering as if in great weakness, but a more transparent fraud could not have been practised : he was, in fact, lying on his oars, pending further negotiations. The Amlah proposed that Campbell should sign a bond, granting immunity for all past offences on their part, whilst they were to withdraw the letter of grievances against him. The Lamas cast horoscopes for the future, little presents continually arrived for us, and the Ranee sent me some tobacco, and to Campbell brown sugar and Murwa beer. The blacksmiths, who had been ostentatiously making long knives at the forge hard by, were dismissed ; troops were said to be arriving at

\* We forget that all our concessions to these people are interpreted into weakness ; that they who cannot live on an amicable equality with one another, cannot be expected to do so with us ; that all our talk of power and resources are mere boasts to habitual bullies, so long as we do not exert ourselves in the correction of premeditated insults. No Government can be more tolerant, more sincerely desirous of peace, and more anxious to confine its sway within its own limits than that of India, but it can only continue at peace by demanding respect, and the punctilious enforcement of even the most trifling terms in the treaties it makes with Indo-Chinese.

Dorjiling, and a letter sternly demanding our release was received.

The Lamas of Pemiongchi, Changachelling, Tassiding, &c., and the Dewan's enemies, and Tchebu Lama's friends, began to flock from all quarters to Tumloong, demanding audience of the Rajah, and our instant liberation. The Dewan's game was evidently up; but the timidity of his opponents, his own craft, and the habitual dilatoriness of all, contributed to cause endless delays. The young Gangtok Kajee tried to curry favour with us, sending word that he was urging our release, and adding that he had some capital ponies for us to see on our way to Dorjiling! Many similar trifles showed that these people had not a conception of the nature of their position, nor of that of an officer of the British Government.

The Tchebu Lama visited us only once, and then under surveillance; he renewed his professions of good faith, and we had every reason to know that he had suffered severely for his adherence to us, and consistent repudiation of the Amlah's conduct: he was in great favour with his brother Lamas, but was not allowed to see the Rajah, who was said to trust to him alone of all his counsellors. He told us that peremptory orders had arrived from Calcutta for our release, but that the Amlah had replied that they would not acknowledge the despatch, from its not bearing the Governor-General's great seal! The country-people refusing to be saddled with the keep of our coolies, they were sent to Dorjiling in small parties, charged to say that we were free, and following them.

The weather continued rainy and bad, with occasionally a few hours of sunshine, which, however, always rendered the ditch before our door offensive: we were still prevented leaving the hut, but as a great annual festival was going on, we were less disagreeably watched. Campbell was very unwell, and we had no medicine; and as the Dewan, accustomed to such duplicity himself, naturally took this for a *ruse*, and refused to allow us to send to Dorjiling for any, we were more than ever convinced that his own sickness was simulated.

On the 2nd and 3rd December we had further conferences with the Dewan, who said that we were to be taken to Dorjiling in six days, with two Vakeels from the Rajah. The Pemiongchi Lama, as the oldest and most venerated in Sikkim, attended, and addressed Campbell in a speech of great feeling and truth. Having heard, he said, of these unfortunate circumstances a few days ago, he had come on feeble limbs, and though upwards of seventy winters old, as the representative of his holy brotherhood, to tender advice to his Rajah, which he hoped would be followed. Since Sikkim had been connected with the British rule, they had experienced continued peace and protection; whereas before they were in constant dread of their lives and properties, which, as well as their most sacred temples, were violated by the Nepalese and Bhotanese. He then dwelt upon Campbell's invariable kindness and good feeling, and his exertions for the benefit of their country, and for the cementing of friendship, and hoped he would not let these untoward events induce



an opposite course in future; but that he would continue to exert his influence with the Governor-General in their favour.

The Dewan listened attentively; he was anxious and perplexed, and evidently losing his presence of mind: he talked to us of Lhasa and its gaieties, dromedaries, Lamas, and everything Tibetan; offered to sell us ponies cheap, and altogether behaved in a most undignified manner; ever and anon calling attention to his pretended sick leg, which he nursed on his knee. He gave us the acceptable news that the government at Calcutta had sent up an officer to carry on Campbell's duties, which had alarmed him exceedingly. The Rajah, we were told, was very angry at our seizure and detention; he had no fault to find with the Governor-General's agent, and hoped he would be continued as such. In fact, all the blame was thrown on the brothers of the Dewan, and of the Gangtok Kajee, and more irresponsible stupid boors could not have been found on whom to lay it, or who would have felt less inclined to commit such folly if it had not been put on them by the Dewan. On leaving, white silk scarfs (emblems of peace and friendship) were thrown over our shoulders, and we went away, still doubtful, after so many disappointments, whether we should really be set at liberty at the stated period.

Although there was so much talk about our leaving, our confinement continued as rigorous as ever. The Dewan curried favour in every other way, sending us Tibetan wares for purchase, with absurd prices attached, he being an arrant pedlar. All the principal families

waited on us, desiring peace and friendship. The coolies who had not been dismissed were allowed to run away, except my Bhotan Sirdar, Nimbo, against whom the Dewan was inveterate : \* he, however, managed soon afterwards to break a great chain with which his legs were shackled, and marching at night, eluded a hot pursuit, and proceeded to the Teesta, swam the river, and reached Dorjiling in eight days ; arriving with a large iron ring on each leg, and a link of several pounds weight attached to one.

Parting presents arrived from the Rajah on the 7th, consisting of ponies, cloths, silks, woollens, immense squares of butter, tea, and the usual et ceteras, to the utter impoverishment of his stores : these he offered to the two Sahibs, "in token of his amity with the British government, his desire for peace, and deprecation of angry discussions." The Ranee sent silk purses, fans, and similar Tibetan paraphernalia, with an equally amicable message, that "she was most anxious to avert the consequences of whatever complaints had gone forth against Dr. Campbell, who might depend on her strenuous exertions to persuade the Rajah to do whatever he wished !" These friendly messages were probably evoked by the information that an English regiment, with three guns, was on its way to Dorjiling, and that 300 Sepoys had already arrived there. The government of Bengal sending another agent was also a contingency they had not anti-

\* The Sikkim people are always at issue with the Bhotanese. Nimbo was a runaway slave of the latter country, who had been received into Sikkim, and retained there until he took up his quarters at Dorjiling.

cipated, having fully expected to get rid of any such obstacle to direct communication with the Governor-General.

A present from the whole population followed that of the Ranee, coupled with earnest entreaties that Campbell would resume his position at Dorjiling; and on the following day forty coolies mustered to arrange the baggage. Before we left, the Ranee sent three rupees to buy a yard of chalé and some gloves, accompanying them with a present of white silk, &c., for Mrs. Campbell, to whom the commission was intrusted: a singular instance of the *insouciant* simplicity of these odd people.

The 9th of December was a splendid and hot day, one of the very few we had had during our captivity. We left at noon, descending the hill through an enormous crowd of people, who brought farewell presents, all wishing us well. We were still under escort as prisoners of the Dewan, who was coolly marching a troop of forty unloaded mules and ponies, and double that number of men's loads of merchandise, purchased during the summer in Tibet, to trade with at Dorjiling and the Titalya fair! His impudence or stupidity was thus quite inexplicable; treating us as prisoners, ignoring every demand of the authorities at Dorjiling, of the Supreme Council of Calcutta, and of the Governor-General himself; and at the same time acting as if he were to enter the British territories on the most friendly and advantageous footing for himself and his property, and incurring so great an expense in all this as to prove that he was in earnest in thinking so.

Tchebu Lama accompanied us, but we were not

allowed to converse with him. We halted at the bottom of the valley, where the Dewan invited us to partake of tea; from this place onwards he gave us mules or ponies to ride. On the following day we crossed a high ridge from the Ryott valley to that of the Rungmi; where we camped at Tikbotang, and on the 11th at Gangtok Sampoo, a few miles lower down the same valley.

We were now in the Soubahship of the Gangtok Kajee, a member of the oldest and most wealthy family in Sikkim; he had from the first repudiated the late acts of the Amlah, in which his brother had taken part, and had always been hostile to the Dewan. The latter conducted himself with disagreeable familiarity towards us, and *hauteur* towards the people; he was preceded by immense kettle-drums, carried on men's backs, and great hand-bells, which were beaten and rung on approaching villages; on which occasions he changed his dress of sky-blue, for yellow silk robes worked with Chinese dragons, to the indignation of Tchebu Lama, an amber robe in polite Tibetan society being sacred to royalty and the Lamas. We everywhere perceived unequivocal symptoms of the dislike with which he was regarded. Cattle were driven away, villages deserted, and no one came to pay respects, or bring presents, except the Kajees, who were ordered to attend, and his elder brother, for whom he had usurped an estate near Gangtok.

On the 13th, he marched us a few miles, and then halted for a day at Serriomsa, at the bottom of a hot valley full of irrigated rice-crops and plantain and orange-groves. Here the Gangtok Kajee waited on us

with a handsome present, and informed us privately of his cordial hatred of the "upstart Dewan," and hopes for his overthrow ; a demonstration of which we took no notice. The Dewan's brother (one of the Amlah) also sent a large present, but was ashamed to appear. Another letter reached the Dewan here, directed to the Rajah ; it was from the Governor-General at Bombay, and had been sent across the country by special messengers : it demanded our instant release, or his Raj would be forfeited ; and declared that if a hair of our heads were touched, his life should be the penalty.

The Rajah was incessantly urging the Dewan to hasten us onwards as free men to Dorjiling, but the latter took all remonstrances with assumed coolness, exercised his ponies, played at bow and arrow, intruded on us at meal-times to be invited to partake, and loitered on the road, changing garments and hats, which he pestered us to buy. Nevertheless, he was evidently becoming daily more nervous and agitated.

From the Rungmi valley we crossed on the 14th southward to that of Runniok, and descended to Dikkeeling, a large village of Bhotanese, which is much the most populous, industrious, and at the same time turbulent in Sikkim. This district once belonged to Bhotan, and was ceded to the Sikkim Rajah by the Paro Pilo,\* in consideration of some military services, rendered by the former in driving off the Tibetans, who had usurped it for the authorities of Lhassa. Since then the Sikkim and Bhotan people have

\* The temporal sovereign, in contra-distinction to the Dhurma Rajah, or spiritual sovereign of Bhotan.

repeatedly fallen out, and Dikkeeling has become a refuge for runaway Bhotanese, and kidnapping is constantly practised on this frontier.

The Bhotanese are more industrious than the Lepchas, and better husbandmen; besides having superior crops of all ordinary grains, they grow cotton, hemp, and flax. The cotton is cleansed here as elsewhere, with a simple gin. The Lepchas use no spinning wheel, but a spindle and distaff; their loom, which is Tibetan, is a very complicated one framed of bamboo; it is worked by hand, without beam, treddle, or shuttle.

The Dewan halted us here for three days, for no assigned cause. On the 16th, letters arrived, including a most kind and encouraging one from Mr. Lushington, who had taken charge of Campbell's office at Dorjiling. Immediately after arriving, the messenger was seized with violent vomitings and gripings: we could not help suspecting poison, especially as we were now amongst adherents of the Dewan, and the Bhotanese are notorious for this crime. Only one means suggested itself for proving this, and with Campbell's permission I sent my compliments to the Dewan with a request for one of his hunting dogs to eat the vomit. It was sent at once, and performed its duty without any ill effects. I must confess to have felt a malicious pleasure in the opportunity thus afforded of showing our jailor how little we trusted him; feeling indignant at the idea that he should suppose he was making any way in our good opinion by his familiarities, which we were not in circumstances to resist. The crafty fellow, however, outwitted me by inviting us to dine

with him the same day, and putting our stomachs and noses to a severe test. Our dinner was served in Chinese fashion, but most of the luxuries, such as *bêche-de-mer*, were very old and bad. We ate, sometimes with chop-sticks, and at others with Tibetan spoons, knives, and two-pronged forks. After the usual amount of messes served in oil and salt water, sweets were brought, and a strong spirit. Thoba-sing, our filthy, cross-eyed spy, was waiter, and brought in every little dish with both hands, and raised it to his greasy forehead, making a sort of half bow previous to depositing it before us. Sometimes he undertook to praise its contents, always adding, that in Tibet none but very great men indeed partook of such sumptuous fare. Thus he tried to please both us and the Dewan, who conducted himself with pompous hospitality, showing off what he considered his elegant manners and graces. Our blood boiled within us at being so patronised by the squinting ruffian, whose insolence and ill-will had sorely aggravated the discomforts of our imprisonment.

Not content with giving us what he considered a magnificent dinner (and it had cost him some trouble), the Dewan produced a little bag from a double-locked escritoire, and took out three dinner-pills, which he had received as a great favour from the Rimbochay Lama, and which were a sovereign remedy for indigestion and all other ailments; he handed one to each of us, reserving the third for himself. Campbell refused his; but there appeared no help for me, after my groundless suspicion of poison, and so I swallowed the pill with

the best grace I could. But in truth, it was not poison I dreaded in its contents, so much as being compounded of some very questionable materials, such as the Rimbochay Lama blesses and dispenses far and wide. To swallow such is a sanctifying work, according to Boodhist superstition, and I believe there was nothing in the world, save his ponies, to which the Dewan attached a greater value.

To wind up the feast, we had pipes of excellent mild yellow Chinese tobacco, made from *Nicotiana rustica*, which is cultivated in East Tibet, and in West China. It resembles in flavour the finest Syrian tobacco, and is most agreeable when the smoke is passed through the nose. The common tobacco of India is much imported into Tibet, where it is called "Tamma," (probably a corruption of the Persian "Toombac,") and is said to fetch the enormous price of 30s. per lb. at Lhassa, which is sixty times its value in India. Rice at Lhassa, when cheap, sells at 2s. for 5 lbs.; it is all bought up for rations for the Chinese soldiery.

On the 18th we were marched three miles only, and on the following day five miles farther, to Katong Ghat on the Teesta river, which we crossed with rafts, and camped on the opposite bank, a few miles above its junction with the Great Rungeet. The water, which is sea-green in colour, had a temperature of  $53\frac{1}{2}^{\circ}$ ; its current was very powerful. The climate was hot, and the vegetation on the banks tropical; on the hills around, lemon-bushes were abundant, apparently growing wild.

The Dewan was now getting into a very nervous and



depressed state : he was determined to keep up appearances before his followers, but was almost servile to us ; he caused his men to make a parade of their arms, as if to intimidate us, and in descending narrow gulleys we had several times the disagreeable surprise of finding some of his men at a sudden turn, with drawn bows and arrows pointed towards us. Others gesticulated with their long knives, and made fell swoops at soft plantain-stems ; but these artifices were all as shallow as they were contemptible, and a smile at such demonstrations was generally answered with another from the actors.

From Katong we ascended the steep east flank of Tendong or Mount Ararat, through forests of Sal and long-leaved pine, to Namten, where we halted two days. The Dingpun Tinli lived near, and waited on us with a present, which, with all others that had been brought, Campbell received officially, and transferred to the authorities at Dorjiling.

The Dewan was thoroughly alarmed at the news here brought in, that the Rajah's present of yaks, ponies, &c., which had been sent forward, had been refused at Dorjiling ; and equally so at the clamorous messages which reached him from all quarters, demanding our liberation ; and at the desertion of some of his followers, on hearing that large bodies of troops were assembling at Dorjiling. Repudiated by his Rajah and countrymen, and paralysed between his dignity and his ponies, (which he now perceived would not be welcomed at the station, and which were daily losing flesh, looks, and value in these hot valleys,

where there is no grass pasture,) he knew not what olive-branch to hold out to our government, except ourselves, whom he therefore clung to as hostages.

On the 22nd of December he marched us eight miles further, to Cheadam, on a bold spur, overlooking the Great Rungeet, and facing Dorjiling, from which it is only twenty miles distant. The white bungalows of our friends gladdened our eyes, while the new barracks erecting for the daily arriving troops struck terror into the Dewan's heart. The six Sepoys \* who had marched valiantly beside us for twenty days, carrying the muskets given to the Rajah the year before by the Governor-General, now lowered their arms, and vowed that if a red coat crossed the Great Rungeet, they would throw down their guns and run away. News arrived that the Bhotan inhabitants of Dorjiling, headed by my bold Sirdar Nimbo, had arranged a night attack for our release; an enterprise to which they were quite equal, and in which they have had plenty of practice in their own misgoverned country. Watch-fires gleamed amongst the bushes, we were thrust into a doubly-guarded house, and bows and arrows were ostentatiously levelled so as to rake the doorway, should we attempt to escape. Some of the ponies were sent back, though the Dewan still clung to his merchandise and the feeble hope of traffic. The confusion increased daily, but

\* These Sepoys, besides the loose red jacket and striped Lepcha kirtle, wore a very curious national black hat of felt, with broad flaps turned up all round: this is represented in the right-hand figure, in the illustration on the next page. A somewhat similar hat is worn by some classes of Nepal soldiery.

though Tchebu Lama looked brisk and confident, we were extremely anxious ; scouts were hourly arriving from the road to the Great Rungeet, and if our troops



LEPCHA SEPOYS. TIBETAN SEPOYS IN THE BACK-GROUND.

had advanced, the Dewan might have made away with us from pure fear.

One morning he paid us a long visit, and brought some flutes, of which he gave me two very common ones of apricot wood, from Lhassa, producing at the same time a beautiful one, which I believe he intended for Campbell, but his avarice got the better, and he commuted his gift into the offer of a tune, and

pitching it in a high key, he went through a Tibetan air that almost deafened us by its screech. He tried bravely to maintain his equanimity, but as we preserved a frigid civility, and only spoke when addressed, the tears would start from his eyes in the pauses of conversation. In the evening he came again; he was excessively agitated and covered with perspiration, and thrust himself unceremoniously between us on the bench we occupied. As his familiarity increased, he put his arm round my neck, and since he was armed with a small dagger, I felt rather uneasy about his intentions, but he ended by forcing on my acceptance a coin, value threepence, for he was in fact beside himself with terror.

Next morning Campbell received a hint that this was a good opportunity for a vigorous remonstrance. The Dewan came with Tchebu Lama, his own younger brother (who was his pony-driver), and the Lassoo Kajee; who had for two months placed himself in an attitude of hostility opposite Dorjiling, with a ragged company of followers, but now sought peace and friendship as much as the Dewan. The latter told us he was waiting for a reply to a letter addressed to Mr. Lushington, after which he would set us free. Campbell said: "As you appear to have made up your mind, why not dismiss us at once?" He answered that we should go the next day at all events. Here I came in, and on hearing from Campbell what had passed, I added, that he had better for his own sake let us go at once; that the next day was our great and only annual Poojah (religious festival) of Christmas, when we all

met; whereas he and his countrymen had dozens in the year. As for me, he knew I had no wife, nor children, nor any relation, within thousands of miles, and it mattered little where I was, he was only bringing ruin on himself by his conduct to me as the Governor-General's friend; but, as regarded Campbell, the case was different; his home was at Dorjiling, which was swarming with English soldiers, all in a state of exasperation, and if he did not let us depart before Christmas, he would find Dorjiling too hot to hold him, let him offer what reparation he might for the injuries he had done us. I added: "We are all ready to go—dismiss us." The Dewan again turned to Campbell, who said, "I am quite ready; order us ponies at once, and send our luggage after us." He then ordered the ponies, and three men, including Meepo, to attend us; whereupon we walked out, mounted, and made off with all speed.

We arrived at the cane bridge over the Great Rungeet at 4 P.M., and to our chagrin found it in the possession of a posse of ragged Bhoteas, though there were thirty armed Sepoys of our own at the guard-house on the opposite bank. At Meepo's order they cut the network of fine canes by which they had rendered the bridge impassable, and we crossed. The Sepoys at the guard-house turned out with their clashing arms and bright accoutrements, and saluted to the sound of bugles; scaring our three companions, who ran back as fast as they could go. We rode up at once to Dorjiling, and I arrived at 8 P.M. at Hodgson's house, where I was taken for a ghost, and received with shouts of welcome

by my kind friend and his guest Dr. Thomson, who had been awaiting my arrival for upwards of a month.

Thus terminated our Sikkim captivity, and my last Himalayan exploring journey, which in a botanical and geographical point of view had answered my purposes beyond my most sanguine expectations, though my collections had been in a great measure destroyed by so many untoward events. It enabled me to survey the whole country, and to execute a map of it, and Campbell had further gained that knowledge of its resources which the British Government should all along have possessed, as the protector of the Rajah and his territories.

It remains to say a few words of the events that succeeded our release, in so far as they relate to my connection with them. The Dewan moved from Cheadam to Namtchi, immediately opposite Dorjiling, where he remained throughout the winter. The supreme government of Bengal demanded of the Rajah that he should deliver up the most notorious offenders, and come himself to Dorjiling, on pain of an army marching to Tumloong to enforce the demand; a step which would have been easy, as there were neither troops, arms, ammunition, nor other means of resistance, even had there been the inclination to stop us, which was not the case. The Rajah would in all probability have delivered himself up at Tumloong, throwing himself on our mercy, and the army would have sought the culprits in vain, both the spirit and the power to capture them being wanting on the part of the people and their ruler.

The Rajah expressed his willingness, but pleaded his inability to fulfil the demand, whereupon the threat was repeated, and additional reinforcements were moved to Dorjiling. The general officer in command at Dinapore was ordered to Dorjiling to conduct operations: his skill and bravery had been proved during the progress of the Nepal war so long ago as 1815. From the appearance of the country about Dorjiling, he was led to consider Sikkim to be impracticable for a British army. This was partly owing to the forest-clad mountains, and partly to the fear of Tibetan troops coming to the Rajah's aid, and the Nepalese\* taking the opportunity to attack us. With the latter we were in profound peace, and we had a resident at their court; and I have elsewhere shown the impossibility of a Tibet invasion, even if the Chinese or Lhassan authorities were inclined to interfere in the affairs of Sikkim, which they long ago formally declined doing in the case of aggressions of the Nepalese and Bhotanese; the Sikkim Rajah being under British protection.

There were not wanting offers of leading a company of soldiers to Tumloong, rather than that the threat should have twice been made, and then withdrawn; but they were not accepted. A large body of troops was however marched from Dorjiling, and encamped on

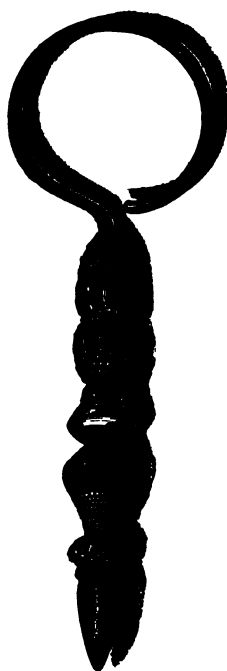
\* Jung Bahadoor was at this time planning his visit to England, and to his honour I must say, that on hearing of our imprisonment he offered to the government at Calcutta to release us with a handful of men. This he would no doubt have easily effected, but his offer was wisely declined, for the Nepalese want Sikkim and Bhotan too, and we had undertaken the protection of the former country, mainly to keep the Nepalese out of it.

the north bank of the Great Rungeet for some weeks; but after that period they were recalled without any further demonstration; the Dewan remaining encamped the while on the Namtchi hill, not three hours' march above them. The simple Lepchas daily brought our soldiers milk, fowls, and eggs, and would have continued to do so had they proceeded to Tumloong, for I believe both Rajah and people would have rejoiced at our occupation of the country.

After the withdrawal of the troops, the threat was modified into a seizure of the Terai lands, which the Rajah had originally received as a free gift from the British, and which were the only lucrative or fertile estates he possessed. This was effected by four policemen taking possession of the treasury (which contained exactly twelve shillings, I believe), and announcing to the villagers the confiscation of the territory to the British government, in which they gladly acquiesced. At the same time there was annexed to it the whole southern part of Sikkim, between the Great Rungeet and the plains of India, and from Nepal on the west to the Bhotan frontier, and the Teesta river on the east; thus confining the Rajah to his annual grant of £300 a year which he formerly received. He has forbidden the culprits his court, but can do no more. The Dewan, disgraced and turned out of office, is reduced to poverty, and is deterred from entering Tibet by the threat of being dragged to Lhassa with a rope round his neck. Considering, however, his energy, a rare quality in these countries, I should not be surprised at his yet cutting a figure in



Bhotan, if not in Sikkim itself: especially if, at the Rajah's death, the British government should refuse to take the country under their protection. The Singtam Soubah and the other culprits live disgraced at their homes. Tchebu Lama has received a handsome reward, and a grant of land at Dorjiling, where he resides, and whence he sends me his salaams by every opportunity.



DEWAN'S EAR-RING.

## CHAPTER XXVII.

Leave Dorjiling for Calcutta—Jung Bahadoor—Dr. Falconer—Improvements in Botanic Gardens—Palmetum—Victoria—*Amherstia*—Orchids spread by seed—Banyan—Importation of American plants in ice—Return to Dorjiling—Leave with Dr. Thomson for the Khasia mountains—Mahanuddee river—Vegetation of banks—Maldah—Alligators—Rampore—Beauleah—Climate of Ganges—Pubna—Jummul river—Altered course of Burrampooter and Megna—Dacca—Conch-shells—Saws—Cotton muslins—Fruit—Vegetation—Rose of Bengal—Burrampooter—Delta of Soormah river—Jheels—Soil—Vegetation—Navigation—Mosquitos—Effects of geological changes—Imbedding of plants—Teelas or islets—Chattuc—Salubrious climate—Rains—Canoes—Pundua—Terrya Ghat—Ascent to Churra—Scenery and vegetation at foot of mountains—Cascades.

I was chiefly occupied during January and February of 1850, in arranging and transmitting my collections to Calcutta, and in completing my manuscripts, maps, and surveys. My friend Dr. Thomson having joined me here, for the purpose of our spending a year in travelling and botanising together, it became necessary to decide on the best field for our pursuits. Bhotan offered the most novelty, but it was inaccessible to Europeans; and we therefore turned our thoughts to Nepal, and, failing that, to the Khasia mountains.

The better to expedite our arrangements I made a

trip to Calcutta in March, where I expected to meet both Lord Dalhousie, on his return from the Straits of Malacca, and Jung Bahadoor (the Nepalese minister), who was then *en route* as envoy to England. I stayed at Government House, where every assistance was afforded me towards obtaining the Nepal Rajah's permission to proceed through the Himalaya from Dorjiling to Katmandu. Jung Bahadoor received me with much courtesy, and expressed his great desire to serve me ; but begged me to wait until his return from England, as he could not be answerable for my personal safety when travelling during his absence ; and he referred to the permission he had formerly given me (and such was never before accorded to any European) in earnest of his disposition, which was unaltered. I therefore made up my mind to spend the season of 1850 in the Khasia mountains in eastern Bengal, at the head of the great delta of the Ganges and Burrampooter.

I devoted a few days to the Calcutta Botanic Gardens, where I found my kind friend Dr. Falconer established and very busy. The destruction of most of the palms, and of all the noble tropical features of the gardens, during Dr. Griffith's incumbency, had necessitated the replanting of the greater part of the grounds, the obliteration of old walks, and the construction of new ; it was also necessary to fill up tanks whose waters, by injudicious cuttings, were destroying some of the most valuable parts of the land, to drain many acres, and to raise embankments to prevent the encroachments of the Hoogly : the latter being a work



CALCUTTA BOTANIC GARDENS.

attended with great expense, crippled the resources of the garden library, and other valuable adjuncts ; for the trees which were planted for the purpose having been felled and sold, it became necessary to buy timber at an exorbitant price.

The avenue of Sago-palms, once the admiration of all visitors, and which for beauty and singularity was unmatched in any tropical garden, had been swept away by the same unsparing hand which had destroyed the teak, mahogany, clove, nutmeg, and cinnamon groves. In 1847, when I first visited the establishment, nothing was to be seen of its former beauty and grandeur, but a few noble trees or graceful palms rearing their heads over a low ragged jungle, or spreading their broad leaves or naked limbs over the forlorn hope of a botanical garden, that consisted of open clay beds, disposed in concentric circles, and baking into brick under the fervid heat of a Bengal sun. The rapidity of growth is so great in this climate, however, that within eight months from the commencement of the improvements, a great change had already taken place. The grounds bore a park-like appearance, broad shady walks had replaced the narrow winding paths that ran in distorted lines over the ground, and a large Palmetum, or collection of tall and graceful palms of various kinds, occupied several acres at one side of the garden ; whilst a still larger portion of ground was being appropriated to a picturesque assemblage of certain closely allied families of plants, whose association promised to form a novel and attractive object of

study to the botanist, painter, and landscape-gardener. This consists of groups of all kinds of bamboos, tufted growing palms, rattan-canes, plantains, screw-pines, and similar genera of tropical monocotyledonous plants. All are evergreens of the most vivid hue, some of which, having slender trailing stems, form magnificent masses; others twine round one another, and present impenetrable hillocks of green foliage; whilst still others shoot out broad long wavy leaves from tufted roots; and a fourth class is supported by aerial roots, diverging on all sides and from all heights on their stems, every branch of which is crowned with an enormous plume of grass-like leaves.\*

The great Amherstia tree had been nearly killed by injudicious treatment, and the baking of the soil above its roots. This defect was remedied by sinking bamboo pipes four feet and a half in the earth, and watering through them. Some fine Orchids were in flower in the gardens, but few of them fruit; some appear to be spread by birds amongst the trees; but the different species of *Vanda* are increasing so fast, that there seems no doubt that this tribe of air-plants grows freely from seed in a wild state, though we generally fail to rear them thus in England.

The great Banyan tree is still the pride and orna-

\* Since I left India, these improvements have been still further carried out, and I have since heard of five splendid *Victoria* plants flowering at once, with *Euryale ferox*, white, blue, and red water lilies, and white, yellow, and scarlet lotus, rendering the tanks gorgeous, sunk as their waters are in frames of green grass, ornamented with clumps of *Nipa fruticans* and *Phœnix paludosa*.

ment of the garden.\* Dr. Falconer has ascertained satisfactorily that it is only seventy-five years old : annual rings, size, &c., afford no evidence in such a case, but people were alive a few years ago, who remembered well its site being occupied (in 1782) by a wild Date-palm, out of whose crown the Banyan sprouted, and beneath which a Fakir sat. It is a remarkable fact that the banyan seed rarely vegetates on the ground ; but its figs are eaten by birds, and the seeds deposited in the crowns of palms, where they grow, sending down roots that embrace and eventually kill the palm, which decays away. This tree is now eighty feet high, and throws an area 300 feet in diameter into a dark, cool shade. The gigantic limbs spread out about ten feet above the ground, and on Dr. Falconer's arrival there were no more than eighty-nine descending roots or props ; there are now several hundreds, and the growth of this grand mass of vegetation is proportionably stimulated and increased. The props are induced to sprout by wet clay and moss tied to the branches, beneath which a little pot of water is hung, and after they have made some progress, they are inclosed in bamboo tubes, and so coaxed down to the ground. They are mere slender whip-cords before reaching the earth, where they root, remaining very

\* Had this tree been growing in 1849 over the great palm-stove at Kew, only thirty feet of each end of that vast structure would have been uncovered : its increase was proceeding so rapidly, that by this time it could probably cover the whole. Large banyans are common in Bengal ; but few are so symmetrical as this in shape and height. As the tree gets old, it breaks up into separate masses, the original trunk decaying, and the props becoming separate trunks of the different portions.

lax for several months ; but gradually, as they grow and swell to the size of cables, they tighten, and eventually become very tense. This is a curious phenomenon, and so rapid, that it appears to be due to the rooting part mechanically dragging down the aerial. The branch meanwhile continues to grow outwards, and being supplied by its new support, thickens beyond it, whence the props always slant outwards from the ground towards the circumference of the tree.

During my stay at the gardens, Dr. Falconer received a box of living plants packed in moss, and transported in a frozen state by one of the ice ships from North America : \* they left in November, and arriving in March, I was present at the opening of the boxes, and saw 391 plants (the whole contents) taken out in the most perfect state. They were chiefly fruit-trees, apples, pears, peaches, currants, and gooseberries, with beautiful plants of the Venus' fly-trap. More perfect success never attended an experiment : the plants were in vigorous bud, and the day after being released from their icy bonds, the leaves sprouted and unfolded, and they were packed in Ward's cases for immediate transport to the Himalaya mountains.

I returned to Dorjiling on the 17th of April, and Dr. Thomson and I commenced our arrangements for proceeding to the Khasia mountains. We started on

\* The ice from these ships is sold in the Calcutta market for a penny a pound, to great profit ; it has always proved an invaluable remedy in cases of inflammation and fever, and has diminished mortality to a very appreciable extent.



the 1st of May, and I bade adieu to Dorjiling with no light heart; for I was leaving the kindest and most disinterested friends I had ever made in a foreign land, and a country whose mountains, forests, productions, and people, had all become endeared to me by many ties and associations. The prospects of Dorjiling itself are neither doubtful nor insignificant. Whether or not Sikkim will fall again under the protection of Britain, the station must prosper, and that very speedily. I saw both its native population and its European houses doubled in two years; and its salubrious climate, its scenery, and accessibility, insure it so rapid a further increase that it will become the most populous hill-station in India. Strong prejudices against a damp climate, and the complaints of loungers and idlers who seek pleasure only, together with a groundless fear of the natives, have hitherto retarded its progress; but its natural advantages will outweigh these and all other obstacles.

From Sikkim to the Khasia mountains our course was by boat down the Mahanuddee to the upper Gangetic delta, whose many branches we followed eastwards to the Megna; whence we ascended the Soormah to the Silhet district. We arrived at Kishengunj, on the Mahanuddee, on the 3rd of May, and were delayed two days for our boat, which should have been waiting here to take us to Berhampore on the Ganges.

The approach of the rains was indicated by violent easterly storms of thunder, lightning, and rain; the thermometer ranging from 70° to 85°. The country

around Kishengunj is flat and very barren ; it is composed of a deep sandy soil, covered with a short turf, now swarming with cockchafers. Water is found ten or twelve feet below the surface, and may be supplied by underground streams from the Himalaya, distant forty-five miles. The river, which at this season is low, may be navigated up to Titalya during the rains : its bed averages 60 yards in width, and is extremely tortuous ; the current is slight, and though shallow, the water is opaque. We slowly descended to Maldah, where we arrived on the 11th : the temperature both of the water and of the air increased rapidly ; and the atmosphere became drier as we receded from the mountains.

The boatmen always brought up by the shore at night ; and our progress was so slow, that we could keep up with the boat when walking along the bank. So long as the soil and river-bed continued sandy, few bushes or herbs were to be found, and it was difficult to collect a hundred kinds of plants in a day ; gradually, however, clumps of trees appeared, with jujube bushes, Acacia, a few fan-palms, bamboos, and Jack-trees. I only saw one shell in the river, which harboured few water-plants or birds, and neither alligators nor porpoises ascend so high.

About eighty miles in a straight line from the foot of the Himalaya the stream contracted, and the features of its banks were materially improved by a jungle of tamarisk, wormwood, and white rose-bushes ; whilst mango trees became common, with tamarinds, banyan, and figs. Date and *Caryota* palms, and rattan-canes,

grew in the woods, and parasitic Orchids on the trees, which were covered with a climbing fern, so that we easily doubled our flora of the river banks before arriving at Maldah.

This once populous town is, like Berhampore, now quite decayed, since the decline of its silk and indigo trades: the staple product, called "Maldy," a mixture of silk and cotton, very durable, and which washes well, now forms its only trade, and is exported through Sikkim to the north-west provinces and Tibet. It is still famous for the size and excellence of its mangos, which ripen late in May; but this year the crop had been destroyed by the damp heats of spring, the usual north-west dry winds not having prevailed.

The ruins of the once famous city of Gour, a few miles distant, are now covered with jungle, and the buildings are fast disappearing, owing to the bricks being carried away to be used elsewhere.

Below Maldah the river gets broader, and willow becomes common. We found specimens of a *Planorbis* in the mud of the stream, and saw apparently a boring shell in the alluvium, but could not land to examine it. Chalky masses of alligators' dropping, like coprolites, were very common, buried in the banks, which become twenty feet high at the junction with the Ganges, where we arrived on the 14th. The waters of this great river were nearly two degrees cooler than those of the Mahanuddee.

Rampore-Bauleah is a large station on the north bank of the Ganges, whose stream is at this season fully a mile wide, with a very slow current; its banks

are thirty feet above the water. We were most kindly received by Mr. Bell, the collector of the district, to whom we were greatly indebted for furthering us on our voyage: boats being very difficult to procure, we were detained here from the 16th to the 19th. The elevation of the station is 130 feet above the sea, that of Kishengunj 131: so that the Gangetic valley is nearly a dead level for fully a hundred miles north, beyond which it rises. As Rampore is at the head of the Gangetic delta, which points from the Sunderbunds obliquely to the north-west, it is much damper than any locality further west, as is evidenced by the abundance of two kinds of palm, which do not ascend the Ganges beyond Monghyr.

From Rampore we made very slow progress south-eastwards, with a gentle current, but against constant easterly winds, and often violent gales and thunderstorms, which obliged us to bring up under shelter of banks and islands of sand. Sometimes we sailed along the broad river, whose opposite shores were rarely both visible at once, and at others tracked the boat through narrow creeks that unite the many Himalayan streams, causing them to form a network soon after leaving their mountain valleys.

A few miles beyond Pubna we passed from a narrow canal at once into the main stream of the Burrampooter at Jaffergunj: our maps had led us to expect that this river flowed fully seventy miles to the eastward in this latitude; and we were surprised to hear that within the last twenty years the main body had shifted its course thus far to the westward. This

alteration was not effected by the gradual working westwards of the main stream, but by the old eastern channel so rapidly silting up as to be now unnavigable; while the Jummul, which receives the Teesta, and which is laterally connected by branches with the Burrampooter, became consequently wider and deeper, and eventually the principal stream.

Nothing can be more dreary and uninteresting than the scenery of this part of the delta. The water is clay-coloured and turbid, always cooler than the air, which again was  $4^{\circ}$  or  $5^{\circ}$  below that of Calcutta, with a damper atmosphere.

Ascending the Jummul, we turned off into a narrower channel, sixty miles long, which passes by Dacca, where we arrived on the 28th, and where we were again detained for boats. We botanised in the neighbourhood of the town, which was once very extensive, and is still large, though not flourishing. The population is mostly Mahometan; the site, though beautiful and varied, being unhealthy for Europeans. Ruins of great Moorish brick buildings still remain, and a Greek style of ornamenting the houses prevails to a remarkable degree.

The manufacture of rings for the arms and ancles, from conch-shells imported from the Malayan Archipelago, is still almost confined to Dacca: the shells are sawn across for this purpose by semicircular saws, the hands and toes being both actively employed in the operation. The introduction of circular saws has been attempted by some European gentlemen, but steadily resisted by the natives, despite their obvious advan-

tages. The Dacca muslin manufacture, which once employed thousands of hands, is quite at an end, so that it was with great difficulty that the specimens of these fabrics sent to the Great Exhibition of 1851, were procured. The kind of cotton employed (which is very short in the staple), is now hardly grown, and scarcely a loom exists which is fit for the finest fabrics. The jewellers still excel in gold and silver filagree.

Pine-apples, plantains, mangos, and oranges, abound in the Dacca market, betokening a better climate for tropical fruits than that of Western Bengal; and we also saw the fruit of *Euryale ferox*,\* which is round, soft, pulpy, and the size of a small orange; it contains from eight to fifteen round black seeds as large as peas, which are full of flour, and are eaten roasted in India and China, in which latter country the plant is said to have been in cultivation for upwards of 3000 years.

The native vegetation is very similar to that of the Hoogly, except that the white rose is frequent here. The fact of a plant of this genus being as common on the plains of Bengal as a dog-rose is in England, and associated with cocoa-nuts, palms, mangos, plantains, and banyans, has never yet attracted the attention of botanists, though the species was described by Roxburgh. As a geographical fact it is of great importance, for the rose is usually considered a northern genus, and no kind but this inhabits a damp

\* An Indian water-lily with a small red flower, covered everywhere with prickles, and closely allied to *Victoria regia*.

hot tropical climate. Even in mountainous countries situated near the equator, as in the Himalaya and Andes, wild roses are very rare, and only found at great elevations, whilst they are unknown in the southern hemisphere. It is curious that this rose, which is also a native of Birma and the Indian Peninsula, does not in this latitude grow west of the meridian of  $87^{\circ}$ ; it is confined to the upper Gangetic delta, and inhabits a climate in which a wild rose would least of all be looked for.

We pursued our voyage on the 30th of May, to the old bed of the Burrampooter, an immense shallow sheet of water, of which the eastern bank is for eighty miles occupied by the delta of the Soormah. This river rises on the Munnipore frontier, and flows through Cachar, Silhet, and the Jheels of east Bengal, receiving the waters of the Cachar, Jyntea, Khasia, and Garrow mountains. The immense area thus drained by the Soormah is hardly raised above the level of the sea, and covers 10,000 square miles. The anastomosing rivers that traverse it, flow very gently, and do not materially alter their course; hence their banks gradually rise above the mean level of the surrounding country, and on them the small villages are built, surrounded by extensive rice-fields that need no artificial irrigation. At this season the general surface of the Jheels is marshy; but during the rains, which are excessive on the neighbouring mountains, they resemble an inland sea, the water rising gradually to within a few inches of the floor of the huts; as, however, it subsides as slowly in autumn, it commits no devastation. The

communication is at all seasons by boats, in the management of which the natives (chiefly Mahometans) are expert.

The want of trees and shrubs is the most remarkable feature of the Jheels; in which respect they differ from the Sunderbunds, though the other physical features of each are similar, the level being exactly the same: for this difference there is no apparent cause, beyond the influence of the tide and sea atmosphere. Long grasses of tropical genera, ten feet high, form the bulk of the vegetation, with occasionally low bushes along the firmer banks of the natural canals that everywhere intersect the country; amongst these the rattan-cane, rose, a laurel, and fig, are the most common; while beautiful convolvuli throw their flowering shoots across the water.

The soil, which is sandy along the Burrampooter, is more muddy and clayey in the centre of the Jheels, with immense spongy accumulations of vegetable matter in the marshes, through which we poked the boat-staves without finding bottom: they were for the most part formed of decomposed grass roots, with occasionally leaves, but no quantity of moss or woody plants. Along the courses of the larger streams drift timber and various organic fragments are no doubt imbedded, but as there is no current over the greater part of the flooded surface, there can be little or no accumulation, except perhaps of old canoes, or of such vegetables as grow on the spot. The waters are dark-coloured, but clear and lucid, even at their height.

We proceeded up the Burrampooter, crossing it



obliquely; its banks were on the average five miles apart, and formed of sand, without clay, and with very little silt or mud: the water was clear and brown, like that of the Jheels, and very different from that of the Jummul. We thence turned eastwards into the delta of the Soormah, which we traversed in a north-easterly direction to the stream itself. We often passed through very narrow channels, where the grasses towered over the boats: the boatmen steered in and out of them as they pleased, and we were utterly at a loss to know how they guided themselves, as they had neither compass nor map, and there were few villages or landmarks; and on climbing the mast we saw multitudes of other masts and sails peering over the grassy marshes, doing just the same as we did. All that go up have the south-west wind in their favour, and this helps them to their course, but beyond this they have no other guide but that instinct which habit begets. Often we had to retreat from channels that promised to prove short cuts, but which turned out to be blind alleys. Sometimes we sailed up broader streams of chesnut-brown water, accompanied by fleets of boats repairing to the populous districts at the foot of the Khasia, for rice, timber, lime, coal, bamboos, and long reeds for thatching, all of which employ an inland navy throughout the year in their transport to Calcutta.

Leeches and mosquitos were very troublesome, the latter appearing in clouds at night; during the day they were rarer, but the species was the same. A large cray-fish was common, but there were few birds and no animals to be seen.

To the geologist the Jheels and Sunderbunds are a most instructive region, as whatever may be the mean elevation of their waters, a permanent depression of ten to fifteen feet would submerge an immense tract, which the Ganges, Burrampooter, and Soormah would soon cover with beds of silt and sand. There would be extremely few shells in the beds thus formed, the southern and northern divisions of which would present two very different floras and faunas, and would in all probability be referred by future geologists to widely different epochs. To the north, beds of peat would be formed by grasses; and in other parts, temperate and tropical forms of plants and animals would be preserved in such equally balanced proportions as to confound the palæontologist; with the bones of the long-snouted alligator, Gangetic porpoise, Indian cow, buffalo, rhinoceros, elephant, tiger, deer, boar, and a host of other animals, he would meet with acorns of several species of oak, pine-cones and magnolia fruits, rose seeds, and Cycas nuts, with palm nuts, screw-pines, and other tropical productions. On the other hand, the Sunderbunds portion, though containing the bones of the tiger, deer, and buffalo, would have none of the Indian cow, rhinoceros, or elephant; there would be different species of porpoise, alligator, and deer, and none of the above-mentioned plants, which would be replaced by numerous others, all distinct from those of the Jheels, and many of them indicative of the influence of salt water, whose proximity (from the rarity of sea-shells) might not otherwise be suspected.

On the 1st of June we entered the Soormah, a full



VIEW IN THE JHEELS.

and muddy stream flowing west, a quarter of a mile broad, with banks of mud and clay twelve or fifteen feet high, separating it from marshes, and covered with betel-nut and cocoa-nut palms, figs, and banyans. Many small villages were scattered along the banks, each with a swarm of boats, and rude kilns for burning the lime brought from the Khasia mountains, which is done with grass and bushes. We ascended to Chattuc, against a gentle current, arriving on the 9th.

From this place the Khasia mountains are seen as a long table-topped range running east and west, about 4000 to 5000 feet high, with steep faces towards the Jheels, out of which they appear to rise abruptly. Though twelve miles distant, large waterfalls are very clearly seen precipitating themselves over the cliffs into a bright green mass of foliage, that seems to creep half way up their flanks. Large valleys enter the hills, and are divided by hog-backed spurs, and it is far within these valleys that the waterfalls and precipices occur; but the nearer and further cliffs being thrown by perspective into one range, they seem to rise out of the Jheels so abruptly as to remind one of some precipitous island in the ocean.

Chattuc is mainly indebted for its existence to the late Mr. Inglis, who resided there for upwards of sixty years, and opened a most important trade between the Khasia and Calcutta in oranges, potatoes, coal, lime, and timber. We were kindly received by his son, whose bungalow occupies a knoll, of which there are several, which attracted our attention as being the only elevations fifty feet high which we had met with

since leaving the foot of the Sikkim Himalaya. They rise as islets (commonly called Teela, Beng.) out of the Jheels, within twelve to twenty miles of the Khasia; they are chiefly formed of stratified gravel and sand, and are always occupied by villages and large trees. They seldom exceed sixty feet in height, and increase in number and size as the hills are approached; they are probably the remains of a deposit that was once spread uniformly along the foot of the mountains, and they in all respects resemble those I have described as rising abruptly from the plains near Titalya.

The climate of Chattuc is excessively damp and hot throughout the year, but though sunk amid interminable swamps, the place is perfectly healthy! Such indeed is the character of the climate throughout the Jheels, where fevers and agues are rare; and though no situations can appear more malarious to the common observer than Silhet and Cachar, they are in fact eminently salubrious. These facts admit of no explanation in the present state of our knowledge of endemic diseases. Much may be attributed to the great amount and purity of the water, the equability of the climate, the absence of forests and of sudden changes from wet to dry; but such facts afford no satisfactory explanation.

The rains generally commence in May: they were unusually late this year, though the almost daily gales and thunderstorms we experienced, foretold their speedy arrival. From May till October they are unremitting, and the country is then under water, the Soormah rising about fifty feet.

China roses and tropical plants rendered Mr. Inglis' bungalow gay, but little else will grow in the gardens. Pine apples are the best fruit, and oranges from the foot of the Khasia; plantains ripen imperfectly, and the mango is always acid, attacked by grubs, and having a flavour of turpentine. The violent hailstorms of the vernal equinox cut both spring and cold season flowers and vegetables, and the rains destroy all summer products. The soil is a wet clay, in which some European vegetables thrive well if planted in October or November. We were shown marrowfat peas that had been grown for thirty years without degenerating in size, but their flavour was poor.

Small long canoes, paddled rapidly by two men, were procured here, whereby to ascend the narrow rivers that lead up to the foot of the mountains: they each carry one passenger, who lies along the bottom, protected by a bamboo platted arched roof. We started at night, and early the next morning arrived at Pundua, where there is a dilapidated bungalow: the inhabitants are employed in the debarkation of lime, coal, and potatos. Large fleets of boats crowded the narrow creeks, some of the vessels being of several tons' burden.

Elephants were kindly sent here for us by Mr. H. Inglis, to take us to the foot of the mountains, about three miles distant, and relays of mules and ponies to ascend to Churra, where we were received with the greatest hospitality by that gentleman, who entertained us till the end of June, and procured us servants and collectors.

We spent two days at Pundua, waiting for our great boats (which drew several feet of water), and botanizing in the vicinity. The old bungalow, without windows and with the roof falling in, was a most miserable shelter; and whichever way we turned from the door, a river or a swamp lay before us. Birds, mosquitos, leeches, and large wasps swarmed, also rats and sandflies. A more pestilential hole cannot be conceived; and yet people traverse this district, and sleep here at all seasons of the year with impunity. We did so ourselves in the month of June, when the Sikkim and all other Terais are deadly; we returned in September, traversing the Jheels and nullahs at the very foot of the hills during a short break of fine weather in the middle of the rains; and we again slept here in November,\* always exposed in the heat of the day to wet and fatigue, and never having even a *souppçon* of fever, ague, or rheumatism. This immunity does not, however, extend to the very foot of the hills, as it is considered imprudent to sleep at this season in the bungalow of Terrya, only three miles off, at the very foot of the first rise of the mountains.

The sub-tropical scenery of the lower and outer Sikkim Himalaya, though on a much more gigantic

\* At the north foot of the Khasia, in the heavily-timbered dry Terai stretching for sixty miles to the Burrampooter, it is almost inevitable death for a European to sleep, any time between the end of April and of November. Many have crossed that tract, but not one without taking fever: Mr. H. Inglis was the only survivor of a party of five, and he was ill from the effects for upwards of two years, after having been brought to death's door by the first attack, which came on within three weeks of his arrival at Churra, and by several relapses.

scale, is not comparable in beauty and luxuriance with the really tropical vegetation induced by the hot, damp, and insular climate of these perennially humid mountains. At the Himalaya forests of gigantic trees, many of them deciduous, appear from a distance as masses of dark grey foliage, clothing mountains 10,000 feet high : here the individual trees are smaller, more varied in kind, of a brilliant green, and contrast with grey limestone and red sandstone rocks and silvery cataracts. Palms are more numerous here, upwards of twenty kinds being indigenous ; the cultivated betel-nut especially, raises its graceful stem and feathery crown, "like an arrow shot down from heaven," in luxuriance and beauty above the verdant slopes. This difference is at once expressed to the Indian botanist by defining the Khasia flora as of Malayan character ; by which is meant the prevalence of brilliant glossy-leaved evergreen tribes of trees. Figs abound in the hot gulleys, where the property of their roots, which inosculate and form natural grafts, is taken advantage of in bridging streams, and in constructing what are called living bridges, of the most picturesque forms.\* Oaks, oranges, gamboge, Diospyros, figs, Jacks, plantains, and screw-pines are more frequent here, together with vines and peppers, and above all, palms, both climbing ones with pinnated shining leaves, and erect ones with similar foliage (as cultivated cocoa-nut, and Areca), the broader-leaved wild betel-nut, and beautiful *Caryota* or wine-palm, whose immense leaves are twelve feet long. Laurels and wild nutmegs are frequent in

\* See Frontispiece.



the forest, with the usual prevalence of parasites, mistleto, epiphytical Orchids, ferns, mosses, and Lycopodiums; and on the ground grow ferns, beautiful balsams, and herbaceous and shrubby nettles. Bamboos of many kinds are very abundant, and these hills further differ remarkably from those of Sikkim in the great number of species of grasses.

The ascent was at first gradual, along the sides of a sandstone spur, but at 2000 feet it suddenly became steep and rocky, and at 3000 feet above the sea tree-vegetation disappeared, and we commanded a magnificent prospect of the upper scarped flank of the valley of Moosmai, with four or five beautiful cascades rolling over the table-top of the hills, broken into silvery foam as they leapt from ledge to ledge of the horizontally stratified precipice, and throwing a veil of silver gauze over the gulf of emerald-green vegetation, 2000 feet below. The views of the many cataracts thus precipitated over the bare table-land on which Churra stands, into the valleys on either side, surpass anything of the kind that I have elsewhere seen, though in many respects vividly recalling the scenery around Rio de Janeiro: nor do I know any spot in the world more calculated to fascinate the naturalist who, while appreciating the elements of which a landscape is composed, is also keenly alive to the beauty and grandeur of tropical scenery.

## CHAPTER XXVIII.

Churra, English station of—Khasia people—Garro people—Houses—Habits—Dress—Arms—Dialects—Marriages—Food—Funerals—Superstitions—Flat of Churra—Scenery—Lime and coal—Mamloo—Cliffs—Cascades—Flora of Churra—Orchids—Rhododendrons—Pine—Climate—Extraordinary rain-fall—Its effects—Gardens of Lieuts. Raban and Cave—Leave Churra to cross the mountain range—Kala-panee river—Lailangkot—Boga-panee river—View of Himalaya—Age of Pine-cones—Moflong plants—*Coix*—Chillong mountain—Extensive view—Road to Syong—Broad valleys—Myrung—Kollong rock—Pine-woods—Features of country—Orchids—Iron forges.

CHURRA POONJI is said to be so called from the number of streams in the neighbourhood, and poonji, “a village” (Khas.): it was selected for a European station, partly from the elevation and consequent healthiness of the spot, and partly from its being on the high road from Silhet to Gowahatty, on the Burrampooter, the capital of Assam, which is otherwise only accessible by ascending that river, against both its current and the perennial east wind. A rapid postal communication is hereby secured: but the extreme unhealthiness of the northern foot of the mountains effectually precludes all other intercourse for nine months in the year.

On the first opening up of the country, the Europeans

were brought into sanguinary collision with the Khasias, who fought bravely with bows and arrows, displaying a most blood-thirsty and cruel disposition. This is indeed natural to them; and murders continued very frequent as preludes to the most trifling robberies, until the extreme penalty of our law was put in force. Even now, some of the tributary Rajahs are far from quiet under our rule, and various parts of the country are not safe to travel in. The Garrows, who occupy the western extremity of this range, at the bend of the Burrampooter, are still in a savage state. Human sacrifices and polyandry are said to be frequent amongst them, and their orgies are detestable. Happily we are hardly ever brought into collision with them, except by their occasional depredations on the Assam and Khasia frontier: their country is very unhealthy, but is said to contain abundance of coal, iron, and lime.

We seldom employed fewer than twelve or fourteen of the natives as collectors; and when travelling, from thirty to forty as coolies, &c. They are averse to rising early, and are intolerably filthy in their persons, though not so in their cottages, which are very poor, with broad grass roofs reaching nearly to the ground, and usually encircled by bamboo fences; the latter custom is not common in savage communities, and perhaps indicates a dread of treachery. The beams are of hewn wood (they do not use saws,) often neatly carved, and the doors turn on good wooden pivots. They have no windows, and the fire is made on the floor: the utensils, &c. are placed on hanging shelves and in baskets.

The Khasia people are of the Indo-Chinese race ; they are short, very stout, and muscular, with enormous calves and knees, rather narrow eyes and little beard, broad, high cheekbones, flat noses, and open nostrils. I believe that a few are tattooed. The hair is gathered into a top knot, and sometimes shaved off the forehead and temples. A loose cotton shirt, often striped blue and red, without sleeves, and bordered with long thread fringes, is their principal garment ; people of rank wear it gathered into a girdle of silver chains. A cotton robe is sometimes added, with a large cotton turban or small skull cap. The women wear a long cloth tied in a knot across the breast. During festivals both men and women load themselves with silk robes, fans, peacocks' feathers, and gold and silver ornaments of great value, procured from Assam, many of which are said to be extremely curious, but I never saw any of them. On these occasions spirits are drunk, and dancing kept up all night : the dance is described as a slow ungraceful motion, the women being tightly swathed in cloths.

All their materials are brought from Assam ; the only articles in constant use, of their own manufacture, being a rude sword or knife with a wooden handle and a long, narrow, straight blade of iron ; and the baskets with headstraps, like those used by the Lepchas, but much neater ; also a netted bag of pineapple fibre (said to come from Silhet) which holds a clasp-knife, comb, flint, steel, and betel-nut box. They are much addicted to chewing pawn (betel nut, pepper leaves, and lime) all day long, and their red saliva

looks like blood on the paths. Besides the sword I have described, they carry bows and arrows, and rarely a lance, and a bamboo wicker-work shield.

We found the Khasias to be sulky intractable fellows, contrasting unpleasantly with the Lepchas; wanting in quickness, frankness, and desire to please, and obtrusively independent in manner; nevertheless we had a head man who was very much the reverse of this, and whom we had never any cause to blame. Their language is, I believe, Indo-Chinese and monosyllabic: it is disagreeably nasal and guttural, and there are several dialects and accents in contiguous villages. All inflections are made by prefixing syllables, and when using the Hindoo language, the future is invariably substituted for the past tense. They count up to a hundred, and estimate distances by the number of mouthfuls of pawn they eat on the road.

Education has been attempted by missionaries with partial success, and the natives are said to have shown themselves apt scholars. Marriage is a very loose tie amongst them, and hardly any ceremony attends it. We were informed that the husband does not take his wife home, but enters her father's household, and is entertained there. Divorce and an exchange of wives is common, and attended with no disgrace: thus the son therefore often forgets his father's name and person before he grows up, but becomes strongly attached to his mother. The sister's son inherits both property and rank, and the proprietors' or Rajahs' offspring are consequently often reared in poverty and neglect. The

usual toy of the children is the bow and arrow, with which they are seldom expert ; they are said also to spin pegtops like the English, climb a greased pole, and run round with a beam turning horizontally on an upright, to which it is attached by a pivot.

The Khasias eat fowls, and all meat, especially pork, potatos and vegetables, dried and half-putrid fish in abundance, but they have an aversion to milk, which is very remarkable, as a great proportion of their country is admirably adapted for pasturage. In this respect, however, they assimilate to the Chinese, and many Indo-Chinese nations who are indifferent to milk ; as are the Sikkim people : the Bengalees, Hindoos, and Tibetans, on the other hand, consume immense quantities of milk. They have no sheep, and few goats or cattle, the latter of which are kept for slaughter ; they have, however, plenty of pigs and fowls. Eggs are most abundant, but used for omens only, and it is a common, but disgusting occurrence, to see large groups employed for hours in breaking them upon stones, shouting and quarrelling, surrounded by the mixture of yellow yokes and their red pawn saliva.

The funeral ceremonies are the only ones of any importance, and are often conducted with barbaric pomp and expense ; and rude stones of gigantic proportions are erected as monuments, singly or in rows, circles, or supporting one another, like those of Stonehenge, which they rival in dimensions and appearance. The corpse is burned, though seldom during the rains, from the difficulty of obtaining a fire ; it is therefore preserved in honey (which is abundant and good) till

the dry season : a practice said to prevail among some tribes in the Malay peninsula. Spirits are drunk on these occasions ; but the hill Khasias are not addicted to drunkenness, though some of the natives of the low valleys are very much so. These ascend the rocky faces of the mountains by ladders, to the Churra markets, and return loaded at night, apparently all but too drunk to stand ; yet they never miss their footing in places which are most dangerous to persons unaccustomed to such situations.

The Khasias are superstitious, but have no religion ; like the Lepchas, they believe in a supreme being, and in deities of the grove, cave, and stream. Altercations are often decided by holding the disputants' heads under water, when the longest winded carries his point. Fining is a common punishment, and death for grave offences. The changes of the moon are accounted for by the theory that this orb, who is a man, monthly falls in love with his wife's mother, who throws ashes in his face. The sun is female ; and the Pleiades are called "the Hen-man" (as in Italy "the chickens") : they have names for the twelve months ; they do not divide their time by weeks, but hold a market every fourth day. These people are industrious, and good cultivators of rice, millet, and legumes of many kinds. Potatos were introduced amongst them about twenty years ago by Mr. Inglis, and they have increased so rapidly that the Calcutta market is now supplied by their produce. They keep bees in rude hives of logs of wood.

The flat table-land on which Churra Poonji is placed,

is three miles long and two broad, dipping abruptly in front and on both sides, and rising behind towards the main range, of which it is a spur. The surface of this area is everywhere intersected by shallow, rocky water-courses, which are the natural drains for the deluge that annually inundates it. The western part is undulated and hilly, the southern rises in rocky ridges of limestone and coal, and the eastern is very flat and stony, broken only by low isolated conical mounds.

The scenery varies extremely at different parts of the surface. Towards the flat portion, where the English reside, the aspect is as bleak and inhospitable as can be imagined; and there is not a tree, and scarcely a shrub to be seen, except occasional clumps of screw-pine. The low white bungalows are few in number, and very scattered, some of them being a mile asunder, enclosed with stone walls and shrubs; and a small white church, disused on account of the damp, stands lonely in the centre of all.

The views from the margins of this plateau are magnificent: 4000 feet below are bay-like valleys, carpeted as with green velvet, from which rise tall palms, tree-ferns with spreading crowns, and rattans shooting their pointed heads, surrounded with feathery foliage, as with ostrich plumes, far above the great trees. Beyond are the Jheels, looking like a broad shallow sea with the tide half out, bounded in the blue distance by the low hills of Tippera. To the right and left are the scarped red rocks and roaring waterfalls, shooting far over the cliffs, and then arching their necks as they expand in feathery foam, over which



rainbows float, forming and dissolving as the wind sways the curtains of spray from side to side.

To the south of Churra the lime and coal measures rise abruptly in flat-topped craggy hills, covered with brushwood and small trees. Similar hills are seen far westward across the intervening valleys in the Garrow country, rising in a series of steep isolated ranges, 300 to 400 feet above the general level of the country, and always skirting the south face of the mountains. Considerable caverns penetrate the limestone, the broken surface of which presents many picturesque and beautiful spots, like the same rock in England.

Westward the plateau becomes very hilly, bare, and grassy, with the streams broad and full, but superficial and rocky, precipitating themselves in low cascades over tabular masses of sandstone. At Mamloo their beds are deeper, and full of brushwood, and a splendid valley and amphitheatre of red cliffs and cascades, rivalling those of Moosmai, burst suddenly into view. Mamloo is a large village, on the top of a spur to the westward: it is buried in a small forest, particularly rich in plants, and is defended by a stone wall behind; the only road is tunnelled through the sandstone rock, under the wall; and the spur on either side dips precipitously, so that the place is almost impregnable if properly defended. A sanguinary conflict took place here between the British and the Khasias, which terminated in the latter being driven over the precipices, beneath which many of them were shot. The fan-palm grows on the cliffs near Mamloo: it may be seen on looking over the edge of the plateau, its long curved



trunk rising out of the naked rocks, but its site is generally inaccessible; while near it grows the *Saxifraga ciliaris* of our English gardens, a common plant in the north-west Himalaya, but extremely scarce in Sikkim and the Khasia mountains.

It is extremely difficult to give within the limits of this narrative any idea of the Khasia flora, which is, in extent and number of fine plants, the richest in India, and probably in all Asia. We collected upwards of 2000 flowering plants within ten miles of the station of Churra, besides 150 ferns, and a profusion of mosses, lichens, and fungi. This extraordinary exuberance of species is not so much attributable to the elevation, for the whole Sikkim Himalaya (three times more elevated) does not contain 500 more flowering plants, and far fewer ferns, &c.; but to the variety of exposures; namely, 1. the Jheels, 2. the tropical jungles, both in deep, hot, and wet valleys, and on drier slopes; 3. the rocks; 4. the bleak table-lands and stony soils; 5. the moorlike uplands, naked and exposed, where many species and genera appear at 5000 to 6000 feet, which are not found on the outer ranges of Sikkim under 10,000. In fact, strange as it may appear, owing to this last cause, the temperate flora descends fully 4000 feet lower in the latitude of Khasia than in that of Sikkim, though the former is two degrees nearer the equator.

Orchideæ are, perhaps, the largest natural order in the Khasia, where fully 250 kinds grow, chiefly on trees and rocks, but many are terrestrial, inhabiting damp woods and grassy slopes. I doubt whether in

any other part of the globe the species of orchids outnumber those of any other natural order, or form so large a proportion of the flora. Balsams are next in relative abundance (about twenty-five), both tropical and temperate kinds, of great beauty and variety in colour, form, and size of blossom. Palms amount to twenty, of which the *Chamærops* and *Arenga* are the only genera not found in Sikkim. Of bamboos there are fifteen, and of other grasses 150, which is an immense proportion, considering that the Indian flora (including those of Ceylon, Kashmir, and all the Himalaya), hardly contains 400.

No rhododendron grows at Churra, but several species occur a little further north: there is but one pine besides the yew, and that is only found in the drier interior regions. Singular to say, it is a Chinese species not a native of the Himalaya, but very nearly allied to the long-leaved pine, though more closely resembling the Scotch fir than that tree does.

The climate of Khasia is remarkable for the excessive rain-fall. Attention was first drawn to this by Mr. Yule, who stated, that in the month of August, 1841, 264 inches fell, or twenty-two feet; and that during five successive days, thirty inches fell in every twenty-four hours! Dr. Thomson and I also recorded thirty inches in one day and night, and during the seven months of our stay, upwards of 500 inches fell, so that the total annual fall perhaps greatly exceeded 600 inches, or fifty feet, which has been registered in succeeding years! From April, 1849, to April, 1850, 502 inches (forty-two feet) fell. This unparalleled amount is

attributable to the abruptness of the mountains which face the Bay of Bengal, from which they are separated by 200 miles of Jheels and Sunderbunds.

This fall is very local: at Silhet, not thirty miles further south, it is under 100 inches; at Gowahatty, north of the Khasia in Assam, it is about 80; and even on the hills, twenty miles inland from Churra itself, the fall is reduced to 200. At the Churra station, the distribution of the rain is very local; my gauges, though registering the same amount when placed beside a good one in the station, when removed half a mile, received a widely different quantity, though the different gauges gave nearly the same mean amount at the end of each month.

The direct effect of this deluge is to raise the little streams about Churra fourteen feet in as many hours, and to inundate the whole flat; from which, however, the natural drainage is so complete, as to render a tract, which in such a climate and latitude should be clothed with exuberant forest, so sterile, that no tree finds support, and there is no soil for cultivation of any kind whatsoever, not even of rice. Owing, however, to the hardness of the sandstone, the streams do not cut deep channels, nor have the cataracts worked far back into the cliffs. The limestone alone seems to suffer, and the turbid streams from it prove how rapidly it is becoming worn away.

The mean temperature of Churra (alt. 4000 feet) is about 66°, or 16° below that of Calcutta. In summer the thermometer often rises to 90°; and in the winter, owing to the intense radiation, hoar-frost is frequent.

Such a climate is no less inimical to the cultivation of plants, than is the wretched soil: of this we saw marked instances in the gardens of two of the resident officers, Lieutenants Raban and Cave, to whom we were indebted for the greatest kindness and hospitality. These gentlemen were indefatigable horticulturists, and took a zealous interest in our pursuits, accompanying us in our excursions, enriching our collections in many ways, and keeping an eye to them and to our plant-driers during our absence from the station. In their gardens the soil had to be brought from a considerable distance, and dressed copiously with vegetable matter. Bamboo clumps were planted for shelter within walls, and native shrubs, rhododendrons, &c., introduced. Many orchids grew well on the branches of the stunted trees which they had planted, and some superb kinds of *Hedychium* in the ground; but very few English garden plants thrive in the flower-beds. Even in pots and frames, geraniums, &c., would rot, from the rarity of sunshine, which is as prejudicial as the damp and exposure. Still many wild shrubs of great interest and beauty flourished, and some European ones succeeded with skill and management; as geraniums, *Salvia*, *Petunia*, nasturtium, chrysanthemum, *Kennedya*, *Maurandya*, and *Fuchsia*. The daisy seed sent from England as double, came up very poor and single. Dahlias do not thrive, nor double balsams. Now they have erected small but airy greenhouses, and sunlight is the only desideratum.

At the end of June, we started for the northern or

Assam face of the mountains. The road runs between the extensive and populous native village, or poonji, on the left, and a deep valley on the right, and commands a beautiful view of more waterfalls.

We passed Lailang-kot, a village full of iron forges, from a height near which a splendid view is obtained over the Churra flat. A few old and very stunted shrubs of laurel and *Symplocos* grow on its bleak surface, and these are often sunk from one to three feet in hollows in the horizontally stratified sandstone. I could only account for these by supposing them to be caused by the drip from the trees, and if so, it is a wonderful instance of the wearing effects of water, and of the great age which small bushes sometimes attain.

At about 5000 feet the country is very open and bare, the ridges being so uniform and flat-topped, that the broad valleys they divide are hidden till their precipitous edges are reached; and the eye wanders far to the east and west over a desolate level grassy country, unbroken, save by the curious flat-topped hills I have before described. These features continue for eight miles, when a sudden descent of 600 or 700 feet, leads into the valley of the Kala-panee (Black water) river, where there is a very dark and damp bungalow, which proved a great accommodation to us.

Beyond the Kala-panee, a high ridge is gained above the valley of the Boga-panee, the largest river in the Khasia; and from this the Bhotan Himalaya may be seen in clear weather, at the astonishing distance of from 160 to 200 miles! The vegetation here suddenly assumes a different aspect, from the quantity of stunted

fir-trees clothing the north side of the valley, which rises very steeply 1000 feet above the river: quite unaccountably, however, not one grows on the south face. A new oak also appears abundantly; it has leaves like the English, whose gnarled habit it also assumes.

After descending a very steep slope, the road follows a clear affluent of the Boga-panee, and winds along the margin of that river, which is a rapid turbulent stream, very muddy, and hence contrasting remarkably with the Kala-panee. It derives its mud from the decomposition of granite, which is washed by the natives for iron, and in which rock it rises to the eastward. An elegant iron suspension-bridge is thrown across the stream, from a rock matted with tufts of little parasitic orchids. Crossing it, we came on many pine-trees; these had five-years' old cones on them, as well as those of all succeeding years; they bear male flowers in autumn, which impregnate the cones formed the previous year. Thus, the cones formed in the spring of 1850 are fertilised in the following autumn, and do not ripen their seeds till the second following autumn, that of 1852.

A very steep ascent leads to the bungalow of Moflong, on a broad, bleak hill-top, near the axis of the range (alt. 6,062 feet). Here there is a village, and some cultivation, surrounded by hedges of *Erythrina*, *Pieris*, *Viburnum*, and *Pyrus*, amongst which grew an autumn-flowering larkspur, with most foetid flowers.

We passed the end of June here, and experienced



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We passed the end of June here, and experienced

the same violent weather, thunder, lightning, gales, and rain, which prevailed during every midsummer I spent in India. A great deal of *Coix* (Job's tears) is cultivated about Moflong: it is of a dull greenish purple, and though planted in drills, and carefully hoed and weeded, is a very ragged crop. The shell of the cultivated sort is soft, and the kernel is sweet; whereas the wild *Coix* is so hard that it cannot be broken by the teeth. The produce is small, not above thirty or forty-fold.

From a hill behind Moflong bungalow, on which are some stone altars, a most superb view is obtained to the northward of the Bhotan Himalaya, their snowy peaks stretching in a broken series from north-east to north-west; all are below the horizon of the spectator, though from 17,000 to 20,000 feet above his level. The finest view in the Khasia mountains, and perhaps a more extensive one than has ever before been described, is that from Chillong hill, the culminant point of the range, about six miles north-east from Moflong bungalow. This hill, 6,660 feet above the sea, rises from an undulating grassy country, covered with scattered trees and occasional clumps of wood; the whole scenery being parklike, and as little like that of India at so low an elevation as it is possible to be.

I visited Chillong in October with Lieutenant Cave; starting from Churra, and reaching the bungalow, two miles from its top, the same night, with relays of ponies, which he had kindly provided. We were unfortunate in not obtaining a brilliant view of the

snowy mountains, their tops being partially clouded ; but the *coup d'œil* was superb. Northward, beyond the rolling Khasia hills, lay the Assam valley, seventy miles broad, with the Burrampooter winding through it, fifty miles distant, reduced to a thread. Beyond this, banks of vapour obscured all but the dark range of the Lower Himalaya, crested by peaks of frosted silver, at the immense distance of from 100 to 220 miles from Chillong. All are below the horizon of the observer ; yet so false is perspective, that they seem high in the air. The mountains occupy sixty degrees of the horizon, and stretch over upwards of 250 miles, comprising the greatest extent of snow visible from any point with which I am acquainted.

Westward from Chillong the most distant Garrow hills visible are about forty miles off ; and eastward those of Cachar, which are loftier, are about seventy miles. To the south the view is limited by the Tippera hills, which, where nearest, are 100 miles distant ; while to the south-west lies the sea-like Gangetic delta, whose horizon, lifted by refraction, must be fully 120. The extent of this view is therefore upwards of 340 miles in one direction, and the visible horizon of the observer encircles an area of fully thirty thousand square miles, which is greater than that of Ireland !

Continuing northward from Moflong, after five miles, a sudden descent of 400 feet leads to a broad flat grassy valley, called Syong, beyond which the road passes over low rocky hills, wooded on their north or sheltered flanks only, dividing flat-floored valleys.

Extensive moors succeed, covered with stunted pines, brake, and tufts of harsh grasses.

We descended to the valley of Myrung, one of the most beautiful spots in the Khasia, and a favourite resort, having a superb view of the Himalaya: it is two miles broad, and full of rice cultivation. There is a guard here of light infantry, and a little garden, boasting a gardener and some tea-plants, so that we had vegetables during our four visits to the place, on two of which occasions we stayed some days.

From Kala-panee to Myrung, a distance of thirty-two miles, the road does not vary 500 feet above or below the mean level of 5,700 feet, and the features are the same throughout, of broad flat-floored, steep-sided valleys, divided by bleak, grassy, tolerably level-topped hills.

We twice visited a very remarkable hill, called Kollong, which rises as a dome of granite, 5,400 feet high, ten or twelve miles north-west of Myrung, and conspicuous from all directions. The path to it strikes westerly along the shallow valley of Monai, in which is a village, and much cultivation. Near this there is a large square stockade, formed of tall bamboos placed close together, very like a New Zealand "Pa;" indeed, the whole country much recalls the grassy clay hills, marshy valleys, and bushy ridges of the Bay of Islands.

The hills on either side are sometimes dotted with pine-woods, sometimes conical and bare, with small clumps of pines on the summit only; while in other places are broad tracts containing nothing but young

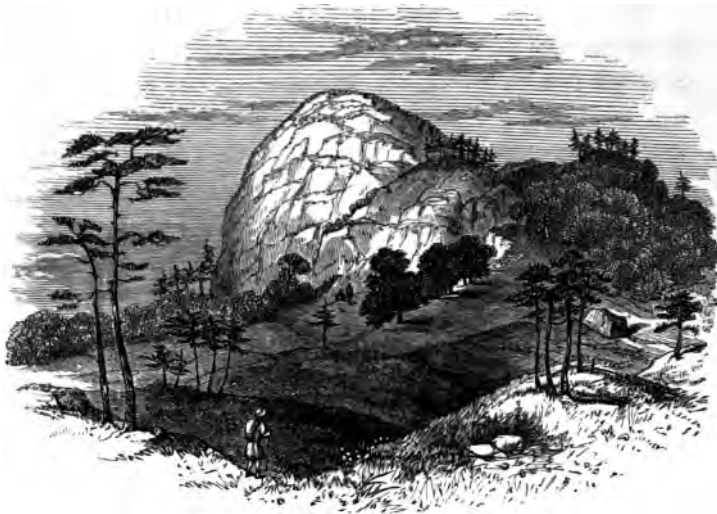
trees, resembling plantations, but which, I was assured, are not planted; on the other hand, however, it is stated that the natives do plant fir-trees, especially near the iron forges, which give employment to all the people of Monai.

All the streams rise in flat marshy depressions amongst the hills with which the whole country is covered; rock is hardly anywhere seen, except in the immediate vicinity of Kollong, where are many scattered boulders of gneiss, of which are made the broad stone slabs, placed as seats, and the other erections of this singular people. We repeatedly remarked cones of earth, clay, and pebbles, about twelve feet high, upon the hills, which appeared to be artificial, but of which the natives could give no explanation. Wild apple and birch are common trees, but there is little jungle, except in the hollows, and on the north slopes of the higher hills. Coarse long grass, with bushes of Labiate and Composite plants, are the prevalent features.

Kollong rock is a steep dome of red granite, accessible from the north and east, but almost perpendicular to the southward. The elevation is 400 feet above the mean level of the surrounding ridges, and 700 above the bottom of the valleys. The south or steepest side is encumbered with enormous detached blocks, while the north is clothed with a dense forest, containing scarlet tree-rhododendrons and oaks; on its skirts grew a white bushy rhododendron, which we found nowhere else. The top was covered with matted mosses, lichens, Lycopodiums, and ferns,

amongst which were many curious and beautiful air-plants.\*

The view from the top is very extensive to the northward, commanding the Assam valley and the

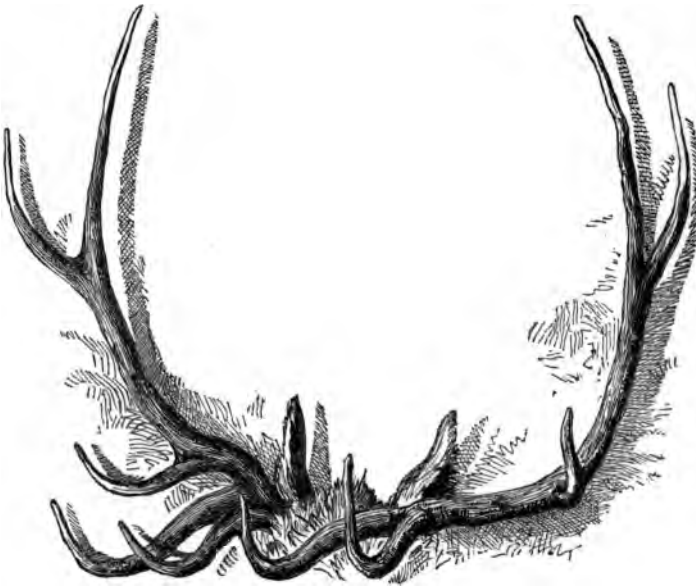


KOLLONG ROCK.

Himalaya, and the billowy range of undulating grassy Khasia mountains. Few houses were visible, but the curling smoke from the valleys betrayed their lurking-places, whilst the tinkling sound of the hammers from the distant forges on all sides was singularly musical

\* *Eria*, *Cælogyne*, *Cymbidium*, *Dendrobium*, and *Sunipia*, some of them flowering profusely; and though freely exposed to the sun and wind, dews and frosts, rain and droughts, they were all fresh, bright, green and strong, under very different treatment from that to which they are exposed in the damp, unhealthy, steamy orchid-houses of our English gardens.

and pleasing; they fell on the ear like "bells upon the wind," each ring being exquisitely melodious, and chiming harmoniously with the others. The solitude and beauty of the scenery, and the emotions excited by the music of chimes, tended to tranquillise our minds, wearied by the fatigues of travel, and the excitement of pursuits that required unremitting attention; and we rested for some time, our imaginations wandering to far-distant scenes, brought vividly to our minds by these familiar sounds.



HORNS OF THE SHOWA STAG (*Cervus Wallichii*), A NATIVE OF CHOOMBI IN TIBET.

Length of antler, 4 feet 6 inches.



## CHAPTER XXIX.

View of Himalaya from the Khasia—Great masses of snow—Chumulari—Donkia—Grasses—Nunklow—Burrampooter—Tropical forest—Bor-panee—Rhododendrons—Wild elephants—Blocks of Syenite—Return to Churra—August temperature—Leave for Chela—Birds—Habits of leaf-insects—Curious village—Houses—Canoes—Boga-panee river—Jheels—Chattuc—Churra—Leave for Jyntea hills—Trading parties—Dried fish—Cherries—Cinnamon—Fraud—Nonkreem—Granite boulders—Iron washing—Forges—Tanks—Siberian *Nymphaea*—Pomrang—Patchouli plant—Mooshye—Pitcher-plant—Joowye cultivation and vegetation—Sulky hostess—Nurtiung—Sacred grove and gigantic stone structures—Altars—Pyramids, &c.—Origin of names—Collections—November vegetation.

THE snowy Himalaya was not visible during our first stay at Myrung, from the 5th to the 10th of July; but on three subsequent occasions, viz., 27th and 28th of July, 13th to 17th October, and 22nd to 25th October, we saw these magnificent mountains, and repeatedly took angular heights and bearings of the principal peaks. The range, as seen from the Khasia, does not form a continuous line of snowy mountains, but the loftiest eminences are conspicuously grouped into masses, whose position is probably between the great rivers which rise far beyond them and flow through Bhotan.

The most conspicuous group of snows seen from the

Khasia bears N.N.E. from Myrung, and consists of three beautiful mountains with wide-spreading snowy shoulders. These are distant (reckoning from west to east) respectively 164, 170, and 172 miles from Myrung.

It is singular, that to the eastward of this group, no snowy mountains are seen, and the lower Himalaya also dip suddenly. This depression is no doubt partly due to perspective; but as there is no such sudden disappearance of the chain to the westward, it is far more probable that the valley of the Soobansiri river, which rises in Tibet far behind these peaks, is broad and open; as is that of the Dihong, still farther east, which we have every reason to believe is the Tibetan Yaru or Burrampooter.

Far to the westward again, and distant 200 miles from Myrung, is a very lofty peaked mountain bearing N.N.W., apparently either Chumulari, or that great peak which I saw due east from Bhomtso top, and which I then estimated at ninety miles off and 23,500 feet high. Donkia, if seen, would be distant 230 miles from the same spot in the Khasia, and Kinchinjunga 260; possibly they are visible (by refraction) from Chillong, though even further from it.

The distance from Myrung to Nunklow is ten miles, along an excellent road. The descent is at first sudden, beyond which the country is undulating, interspersed with jungle (of low trees, chiefly oaks) and marshes, with much rice cultivation. Grasses are exceedingly numerous; we gathered fifty kinds, besides twenty sedges: four were cultivated, namely sugar-

cane, rice, Coix, and maize. Most of the others were not so well suited to pasturage as those of higher localities. Dwarf Date palm occurs by the roadside at 5000 feet elevation.

Nunklow is placed at the northern extremity of a broad spur that overhangs the valley of the Burram-pooter river, thirty miles distant. The elevation of the bungalow is 4,688 feet, and the climate being hot, it swarms with mosquitos, fleas, and rats. It commands a superb view to the north, of the Himalayan snows, of the Burram-pooter, and the intervening malarious Terai; and to the south, of the undulating Khasia, with Kollong rock bearing south-west.

A thousand feet below the bungalow, a tropical forest begins, containing figs, birches, horse-chesnuts, oaks, and nutmegs, in the gulleys, and tall pines on the dry slopes. The pines grow down to the very bottom of the valley in which flows the Bor-panee; many of them are eighty feet high, and three or four in diameter, but none form gigantic trees. The quantity of balsams in the wet ravines is very great, and tree-ferns of several kinds are common.

The Bor-panee is a broad and rapid river that descends from Chillong, and winds round the base of the Nunklow spur; it is about forty yards wide, and is spanned by an elegant iron suspension-bridge, clamped to the rocks on either bank; beneath the bridge is a series of cascades, none high, but all of great beauty from the broken masses of rocks and picturesque scenery on either side. We frequently botanised along the river with great success: many curious plants grow

on its rocky banks, and amongst them *Rhododendron formosum* at the low elevation of 2000 feet. A most splendid fern, *Dipteris Wallichii*, is abundant, with the dwarf Date palm and *Cycas pectinata*.

Wild animals are very abundant here, though extremely rare on the higher part of the Khasia range; tigers, however, and bears, ascend to Nunklow. We saw troops of wild dogs, deer, and immense quantities of the droppings of the wild elephant; an animal considered in Assam dangerous to meet, whereas in other parts of India it is not dreaded till provoked. There is, however, no quadruped that varies more in its native state than this; and an experienced judge will tell at once whether the newly caught elephant is from Assam, Silhet, Cuttack, Nepal, or Chittagong. Some of the differences in size, roundness of shoulders and back, quantity of hair, length of limb, and shape of head, are very marked; and their dispositions are equally various.

The Nunklow spur is covered with enormous rounded blocks of syenite, reposing on clay or on one another. These do not descend the hill, and are the remains of an extensive formation which we could only find *in situ* at one spot on the road to Myrung, but which must have been of immense thickness. One block within ten yards of the bungalow door was fifteen feet long, six high, and eight broad; it appeared half buried, and was rapidly decomposing from the action of the rain. Close by, to the westward, in walking amongst the masses we were reminded of a moraine of most gigantic sized blocks; one which I

measured was forty feet long and eleven above the ground; its edges were rounded, and its surface flaked off in pieces a foot broad and a quarter of an inch thick. Trees and brushwood often conceal the spaces between these fragments, and afford dens for bears and leopards, into which man cannot follow them.

Sitting in the cool evenings on one of these great blocks, and watching the Himalayan glaciers glowing with the rays of sunset, appearing to change in form and dimensions with the falling shadows, it was impossible to refrain from speculating on the possibility of these great boulders heaped on the Himalayan-ward face of the Khasia range, having been transported thither by ice at some former period; especially as the Mont Blanc granite, in crossing the lake of Geneva to the Jura, must have performed a hardly less wonderful ice journey: but this hypothesis is clearly untenable; and unparalleled in our experience as the results appear, if attributed to denudation and weathering alone, we are yet compelled to refer them to these causes. The further we travel, and the longer we study, the more positive becomes our conviction that the part played by these great agents in sculpturing the surface of our planet, is as yet but half recognised.

We returned on the 7th of August to Churra, where we employed ourselves during the rest of the month in collecting and studying the plants of the neighbourhood. We hired a large and good bungalow, in which three immense coal fires were kept up for drying plants and papers, and fifteen men were always employed,

some in changing, and some in collecting, from morning till night. The coal was procured within a mile of our door, and cost about six shillings a month; it was of the finest quality, and gave great heat and few ashes. Torrents of rain descended almost daily, twelve inches in as many hours being frequently registered.

Though the temperature in August rose to  $75^{\circ}$ , we never felt a fire oppressive, owing to the constant damp, and absence of sun. The latter, when it broke through the clouds, shone powerfully, raising the thermometer  $30^{\circ}$  in as many minutes. On such occasions, hot blasts of damp wind ascend the valleys, and impinge suddenly against different houses on the flat, giving rise to extraordinary differences between the mean daily temperatures of places not half a mile apart.

On the 4th of September we started for the village of Chela, which lies west from Churra, at the embouchure of the Boga-panee on the Jheels. The path runs through very tropical vegetation, with pepper, ginger, maize, and Betel palm, cultivated around small cottages, which are only distinguishable in the forest by their yellow thatch of dry Rattan leaves.

Hot gusts of wind blow up the valleys, alternating with clouds and mists, and it was curious to watch the effects of the latter in stilling the voices of insects and birds. Common crows and vultures haunt the villages, but these, and all other large birds, are very rare in the Khasia. A very few hawks are occasionally seen, also sparrows and kingfishers, and I once heard a cuckoo; pheasants are sometimes shot, but we never

saw any. Kites become numerous after the rains, and are regarded as a sign of their cessation. More remarkable than the rarity of birds is the absence of all animals except domestic rats, as a more suitable country for hares and rabbits could not be found. Reptiles, and especially snakes, are very common in the Khasia mountains, and I procured sixteen species and many specimens. The natives repeatedly assured us that these were all harmless, and Dr. Gray, who has kindly examined all my snakes, informs me of the remarkable fact that whereas none of these are poisonous, four out of the eleven species which I found in Sikkim are so. One of the Khasia blind-worms belongs to a truly American genus, a fact as important as is that of the Sikkim skink and Agama being also American forms.

The curious leaf-insect (*Mantis*) was very abundant on the orange trees, on the leaves of which the natives believe it to feed; nor indeed could we persuade some of our friends that its thin sharp jaws are unsuited for masticating leaves, and that these and its prehensile feet indicate its predacious nature: added to which, its singular resemblance to a leaf is no less a provision against its being discovered by its enemies, than an aid in deceiving its prey.

We descended rapidly for many miles through beautiful woods, with villages nestling amongst groves of banana and trellised climbers; and from the brow of a hill looked down upon a slope covered with vegetation and huts, which formed the mart of Chela, and below which the Boga-panee flowed in a deep



CHELA VILLAGE



gorge. The view was a very striking one : owing to the steepness of the valley, the roofs alone of the cottages were visible, from which ascended the sounds and smells of a dense native population, and to which there appeared to be no way of descending. The opposite side rose precipitously in lofty table-topped mountains, and the river was studded with canoes.

The descent was fully 800 feet. The cottages were placed close together, each within a little bamboo enclosure, eight to ten yards deep ; each was built against a perpendicular wall which supported a cutting in the bank behind ; and a similar wall descended in front of it, forming the back of the compartment in which the cottage next below it was erected. The houses were often raised on platforms, and some had balconies in front, which overhung the cottage below. All were mere hollows of wattle or mud, with very high-pitched roofs : stone tanks resembling fonts, urns, coffins, and sarcophagi, were placed near the better houses, and blocks of stone were scattered everywhere.

We descended alternately along the gravelled flat of each enclosure, and perpendicularly down steps cut in the sandstone or let into the walls. I counted 800 houses from the river, and there must be many more ; the inhabitants are Bengalees and Khasias, and perhaps amount to 3000 or 4000 ; but this is a very vague estimate.

We lodged in a curious house, consisting of one apartment, twenty feet long, and five high, raised thirty feet upon bamboos : the walls were of platted bamboo

matting, fastened to strong wooden beams, and one side opened on a balcony that overhung the river. The entrance was an oval aperture reached by a ladder, and closed by folding doors that turned on wooden pivots. The roof was supported by tressels of great thickness, and like the rest of the woodwork, was morticed, no nails being used throughout the building. The floor was of split bamboos laid side by side.

After staying three days at Chela, we descended the stream in canoes, shooting over pebbly rapids, and amongst rocks of limestone, water-worn into fantastic shapes, till we at last found ourselves gliding gently along the still canals of the Jheels. Many of these rapids are so far artificial, that they are enclosed by gravel banks, six feet high, which, by confining the waters, give them depth; but Chela being hardly above the level of the sea, their fall is very trifling. We proceeded across the Jheels to Chattuc, and then north again to Pundua, and so to Churra.

Having pretty well exhausted the botany of Churra, Dr. Thomson and I started on the 18th of September for the eastern part of the Khasia and Jyntea mountains. On the Kala-panee road, which we followed, we passed crowds of market people, laden with dried fish in a half-putrid state, which scented the air for many yards: they were chiefly carp, caught and dried at the foot of the hills. Large parties were bringing down baskets of bird-cherries, cinnamon-bark, iron, pine planks, fire-wood, and potatoes. Of these, the bird-cherries (like damsons) are made into an excellent preserve by the English residents, who also make

capital cherry-brandy of them : the trade in cinnamon is of recent introduction, and is much encouraged by the Inglis family, to whose exertions these people are so greatly indebted ; the cinnamon is the peeled bark of a small species, allied to that of Ceylon, and though inferior in flavour, and mucilaginous (like cassia), finds a ready market at Calcutta. It has been used to adulterate the Ceylon cinnamon ; and an extensive fraud was attempted by some Europeans at Calcutta, who sent boxes of this, with a top layer of the genuine, to England. The smell of the cinnamon loads was as fragrant as that of the fish was offensive.

In the evening we arrived at Nonkreem, a large village in a broad marshy valley, where we procured accommodation with some difficulty, the people being by no means civil, and the Rajah holding himself independent of the British Government.

Atmospheric denudation and weathering have produced remarkable effects on the lower part of the Nonkreem valley, which is blocked up by a pine-crested hill, 200 feet high, entirely formed of round blocks of granite, heaped up so as to resemble an old moraine ; but like the Nunklow boulders, these are not arranged as if by glacial action. The granite is very soft, decomposing into a coarse reddish sand, that colours the Boga-panee. To procure the iron sand, which is disseminated through it, the natives conduct water over the beds, and as the lighter particles are washed away, the remainder is removed to troughs, where the separation of the ore is completed. The smelting is very rudely carried on in charcoal fires, blown by enormous double-

action bellows, worked by two persons, who stand on the machine, raising the flaps with their hands, and expanding them with their feet, as shown in the cut on the next page. There is neither furnace nor flux used in the reduction. The fire is kindled on one side of an



NONKREEM VILLAGE.

upright stone (like the head-stone of a grave), with a small arched hole close to the ground : near this hole the bellows are suspended ; and a bamboo tube from each of its compartments, meet in a larger one, by which the draft is directed under the hole in the stone

to the fire. The ore is run into lumps as large as two fists, with a rugged surface: these lumps are afterwards cleft nearly in two to show their purity.



BELLOWS.

The scenery about Nonkreem village is extremely picturesque, and we procured many good plants on the rocks. The country is everywhere intersected with

trenches for iron-washing, and some large marshes were dammed up for the same purpose: in these we found a diminutive water-lily, the flower of which is no larger than a half-crown; it proves to be the *Nymphæa pygmæa* of China and Siberia—a remarkable fact in the geographical distribution of plants.

From Nonkreem we proceeded easterly to Pomrang, where we took up our quarters in an excellent bungalow, built by Mr. Stainforth (Judge of Silhet). It occupied the eastern extremity of a lofty spur that overhangs the deep fir-clad valley of the Oongkot, dividing Khasia from Jyntea.

A beautiful view extends eastwards to the low Jyntea hills, backed by the blue mountains of Cachar, over the deep valley in front; to the northward, a few peaks of the Himalaya are seen, and westward is Chillong. We staid here till the 23rd September, and then proceeded south-eastwards to Mooshye. The path descends into the valley of the Oongkot, passing the village of Pomrang, and then through woods of pine and oak, the latter closely resembling the English, and infested with galls. The slopes are extensively cultivated with black awnless unirrigated rice, and poor crops of Coix, protected from the birds by scarecrows of lines stretched across the fields, bearing tassels and tufts of fern, shaken by boys.

We crossed the river twice, proceeding south-west to Mooshye, a village placed on an isolated, flat-topped, and very steep-sided hill, 4,863 feet above the sea. A very steep path led up to the top, where there is a stockaded guard-house, once occupied by British

troops, of which we took possession. A Labiate plant (*Mesona Wallichiana*) grew on the ascent, whose bruised leaves smelt as strongly of patchouli, as do those of the plant producing that perfume, to which it is closely allied. The patchouli plant has been said to occur in these parts of India, but we never met with it, and doubt the accuracy of the statement. It is a native of the Malay peninsula, whence the leaves are imported into Bengal, and so to Europe.

On the 25th we left Mooshye for Amwee in Jyntea, which lies to the south-east. We descended by steps



OLD BRIDGE AT AMWEE.

cut in the sandstone, and fording the Oongkot, climbed the hills on its east side, along the grassy tops of which we continued, at an elevation of 4000 feet. Marshy flats intersect the hills, to which wild elephants some-

times ascend, doing much damage to the rice crops. The pitcher-plant (*Nepenthes*) grows on stony and grassy hills about Amwee, and crawls along the ground; its pitchers seldom contain insects in the wild state, nor can any special function be suggested for the wonderful organ it possesses.

About eight miles south of the village is a bridge, half of which is formed of slabs of stone (of which one is twenty-one feet long, seven broad, and two feet three and a half inches thick), supported on piers, and the rest is a well turned arch, such as I have not seen elsewhere among the hill tribes of India. It is fast crumbling away, and is covered with tropical plants, and a beautiful white-flowered orchis grew in the mossy crevices of its stones.

From Amwee our route lay north-east across the Jyntea hills to Joowye, the hill-capital of the district. The path gradually ascended, dipping into valleys occupied by fields of rice in which were placed gigantic images of men, dressed in rags, and armed with bows and arrows, to scare away the wild elephants!

The situation of Joowye is extremely beautiful: it occupies the broken wooded slope of a large open flat valley, dotted with pines; and consists of an immense number of low thatched cottages, scattered amongst groves of bamboo, and fields of plantain, tobacco, yams, sugar-cane, maize, and rice, surrounded by hedges of bamboo, *Colquhounia* and *Erythrina*. Narrow steep lanes lead amongst these, shaded with oak, birch, and Camellia, the larger trees being covered with orchids, climbing palms, pepper, and Gnetum;



while masses of beautiful red and violet balsams grew under every hedge and rock.

We procured a good house after many delays, for the people were far from friendly to Europeans ; it was a clean, very long cottage, with low thatched eaves almost touching the ground, and was surrounded by a high bamboo paling that enclosed out-houses built on a well-swept floor of beaten earth. Within, the wood-work was carved in curious patterns, and was particularly well fitted. The old lady to whom it belonged got tired of us before two days were over, and first tried to smoke us out by a large fire of green wood at that end of the cottage which she retained ; and afterwards by inviting guests to a supper, with whom she kept up a racket all night. Her son, a tall, sulky fellow, came to receive the usual gratuity on our departure, which we made large to show we bore no ill-will : he, however, behaved so scornfully, pretending to despise it, that I had no choice but to pocket it again ; a proceeding which was received with shouts of laughter, at his expense, from a large crowd of bystanders.

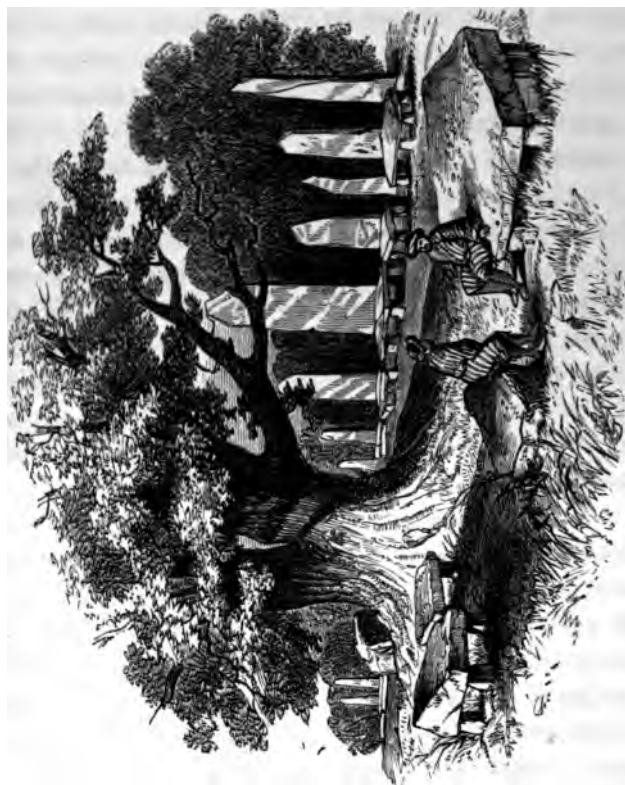
On the 30th of September we proceeded north-east from Joowye to Nurtiung, crossing the watershed of the Jyntea range, which is scarcely raised above the mean level of the hills ; it is about 4,500 feet elevation. To the north the descent is rather abrupt to a considerable stream, beyond which is the village of Nurtiung.

The ascent to the village from the river is by steps cut in a narrow cleft of the rocks, to a flat, elevated 4,178 feet above the sea : we here procured a cottage,

and found the people remarkably civil. The general appearance is the same as at Joowye, but there are here extensive and very unhealthy marshes, whose evil effects we experienced, in having the misfortune to lose one of our servants by fever. Except pines, there are few large trees; but the quantity of species of perennial woody plants contributing to form the jungles is quite extraordinary: we enumerated 140, of which 60 were trees or large shrubs above twenty feet high.

Nurtiung contains a most remarkable collection of those sepulchral and other monuments, which form so curious a feature in the scenery of these mountains, and in the habits of their native population. They are all placed in a fine grove of trees, occupying a hollow; where several acres are covered with gigantic, generally circular, slabs of stone, from ten to twenty-five feet broad, supported five feet above the ground upon other blocks. For the most part they are buried in brushwood of nettles and shrubs, but in one place there is an open area of fifty yards encircled by them, each with a gigantic headstone behind it. Of the latter the tallest was nearly thirty feet high, six broad, and two feet eight inches in thickness, and must have been sunk at least five feet, and perhaps much more, in the ground. They are erected by dint of sheer brute strength, the lever being the only aid.

Splendid trees of Bombax, fig and banyan, overshadowed them: the largest banyan had a trunk five feet in diameter, clear of the buttresses, and numerous small trees of *Celtis* grew out of it, and an immense flowering tuft of *Vanda cœrulea* (the rarest and most



STONES AT FURTUNG.

beautiful of Indian orchids) flourished on one of its limbs. A small plantain with austere woolly scarlet fruit, bearing ripe seeds, was planted in this sacred grove, where trees of the most tropical genera grew mixed with the pine, birch, *Myrica*, and *Viburnum*.

The Nurtiung Stonehenge is no doubt in part religious, as the grove suggests, and also designed for cremation, the bodies being burnt on the altars. In the Khasia these upright stones are generally raised simply as memorials of great events, or of men whose ashes are not necessarily, though frequently, buried or deposited in hollow stone sarcophagi near them, and sometimes in a clay urn placed inside a sarcophagus, or under horizontal slabs.

The usual arrangement is a row of five, seven, or more erect oblong blocks with round heads (the highest being placed in the middle), on which are often wooden discs and cones: more rarely pyramids are built. Broad slabs for seats are also common by the way-side. Mr. Yule, who first drew attention to these monuments, mentions one thirty-two feet by fifteen, and two in thickness; and states that the sarcophagi (which, however, are rare) formed of four slabs, resemble a drawing in Bell's *Circassia*, and descriptions in Irby and Mangles' *Travels in Syria*. He adds that many villages derive their names from these stones, "mau" signifying "stone:" thus "Mausmai" is "the stone of oath," because, as his native informant said, "there was war between Churra and Mausmai, and when they made peace, they swore to it, and placed a stone as a witness;" forcibly recalling the stone

Jacob set up for a pillar, and other passages in the Old Testament. "Mamloo" is "the stone of salt," eating salt from a sword's point being the Khasia form of oath; "Maufiong" is "the grassy stone;" &c. Returning from this grove, we crossed a stream by a single squared block, twenty-eight feet long, five broad, and two thick, of gray granite with large crystals of felspar.

We left Nurtiung on the 4th of October, and walked to Pomrang, a very long and fatiguing day's work. Near the village of Lernai oak woods are passed, in which *Vanda cœrulea* grows in profusion, waving its panicles of azure flowers in the wind. As this beautiful orchid is at present attracting great attention, from its high price, beauty, and difficulty of culture, I shall point out how totally at variance with its native habits, is the cultivation thought necessary for it in England.\* The dry grassy hills which it inhabits are elevated 3000 to 4000 feet: the trees are small, gnarled, and very sparingly leafy, so that the *Vanda* which grows on their limbs is fully exposed to sun, rain, and wind. There is no moss or lichen on the branches with the *Vanda*, whose roots sprawl over the dry rough bark. The atmosphere is on the whole humid, and extremely

\* We collected seven men's loads of this superb plant for the Royal Gardens at Kew; but owing to unavoidable accidents and difficulties, few specimens reached England alive. A gentleman who sent his gardener with us to be shown the locality, was more successful: he sent one man's load to England on commission, and though it arrived in a very poor state, it sold for 300*l.*, the individual plants fetching prices varying from 3*l.* to 10*l.* Had all arrived alive, they would have cleared 1000*l.* An active collector, with the facilities I possessed, might easily clear from 2000*l.* to 3000*l.*, in one season, by the sale of Khasia orchids.

so during the rains; but there is no damp heat, nor stagnation of the air, and at the flowering season the temperature ranges between  $60^{\circ}$  and  $80^{\circ}$ , there is much sunshine, and both air and bark are dry during the day: in July and August, during the rains, the temperature is a little higher than above, but in winter it falls much lower, and hoar-frost forms on the ground. Now this winter's cold, summer's heat, and autumn's drought, and above all, this constant free exposure to fresh air and the winds of heaven, are what of all things we avoid exposing our orchids to in England: it is under these conditions, however, that all the finer Indian *Orchideæ* grow.

On the following day we turned out our Vanda to dress the specimens for travelling, and to preserve the flowers for botanical purposes. Of the latter we had 360 panicles, each composed of from six to twenty-one broad pale-blue tessellated flowers, three and a half to four inches across; and they formed three piles on the floor of the verandah, each a yard high:—what would we not have given to have been able to transport a single panicle to a Chiswick fête!

On the 10th of October we sent twenty-four strong mountaineers to Churra, laden with the collections of the previous month; whilst we returned to Syong; whence we again crossed the range to Nunklow and the Bor-panee, returning to Churra towards the end of the month.

In November the vegetation above 4000 feet turns wintry and brown, the weather becomes chilly, and though the cold is never great, hoar-frost forms at

Churra, and water freezes at Moflong. We prepared to leave as these signs of winter advanced : we had collected upwards of 2,500 species, and for the last few weeks all our diligence, and that of our collectors, had failed to be rewarded by a single novelty. We however procured many species in fruit, and made a collection of upwards of 800 kinds of woods, many of very curious structure. As, however, we projected a trip to Cachar before quitting the neighbourhood, we retained our collectors, giving orders for them to meet us at Chattuc on our way down the Soormah in December, with their collections, which amounted to 200 men's loads.

## CHAPTER XXX.

Boat voyage to Silhet—River—Palms—Fish weirs—Forests of Cachar—Sandal-wood, &c.—Porpoises—Alligators—Silchar—Tigers—Rice-crops—Cookies—Munniporees—Hockey—Dance—Nagas—Excursion to Munniporees frontier—Elephant bogged—Climate, &c. of Cachar—Mosquitos—Fall of bank—Silhet—Tree-ferns—Chattuc—Megna—Noacolly—Salt-smuggling—Delta of Ganges and Megna—Westward progress of Megna—Tide—Waves—Dangerous navigation—Moonlight scenes—Mud island—Chittagong—Views—Trees—Coffee—Pepper—Excursions from Chittagong—Gurjun trees—Earthquake—Birds—Papaw—Poppy and sun fields—Seetakoond bungalow and hill—Perpetual flame—Climate—Leave for Calcutta—Hattiah island—Plants—Sunderbunds—Steamer—Tides—*Nipa fruticans*—Crocodiles—*Phoenix paludosa*—Fishing—Otters—Departure from India.

WE left Churra on the 17th of November, and taking boats at Pundua, crossed the Jheels to the Soormah, which we ascended to Silhet. Thence we continued our voyage 120 miles up the river in canoes, to Silchar, the capital of the district of Cachar: the boats were such as I described at Chattuc, and though it was impossible to sit upright in them, they were paddled with great swiftness. The river at Silhet is 200 yards broad; it is muddy, and flows with a gentle current of two or three miles an hour, between banks six to twelve feet high. As we glided up its stream, villages became rarer, and eminences more frequent in the



Jheels. The people are a tall, bold, athletic Mahometan race, who live much on the water, and cultivate rice, sesamum, and radishes, with betel-pepper in thatched enclosures, as in Sikkim: maize and sugar are rarer, bamboos abound, and a few palms are planted, but no date-palms.

A very long sedge grows by the water, and is used for thatching: boatloads of it are collected for the Calcutta market, for which also were destined many immense rafts of bamboo, 100 feet long. The people fish much, using square and triangular drop-nets stretched upon bamboos, and rude basket-work weirs, that retain the fish as the river falls. Near the villages we saw fragments of pottery three feet below the surface of the ground, showing that the bank, which is higher than the surrounding country, increases from the annual overflow.

About seventy miles up the river, the mountains on the north, which are east of Jyntea, rise 4000 feet high in forest-clad ranges like those of Sikkim. Swamps extend from the river to their base, and penetrate their valleys, which are extremely malarious: their forests are frequented by timber-cutters, who fell jarool, a magnificent tree with red wood, which, though soft, is durable under water, and therefore in universal use for boat building. The toon is also cut, with red sandal-wood; also Nageesa, *Mesua ferrea*, which is highly valued for its weight, strength, and durability: the eagle-wood, a tree yielding uggur oil, is also much sought for its fragrant wood, which is carried to Silhet, where it is broken up and distilled.

Porpoises, and both the long and the short-nosed alligator, ascend the Soormah for 120 miles, being found beyond Silchar; which place we reached on the 22nd; it is a small station about forty feet above the river, which however rises half that height in the rains. Long low spurs stretch from the Tippera hills for many miles north, through the swampy Jheels to the river; and there are also hills on the opposite or north side, but detached from the Cookie hills, as the lofty blue range twelve miles north of the Soormah is called. All these mountains swarm with tigers, wild buffalos, and boars, which also infest the long grass of the Jheels.

During the first Birmese war, a force was sent up to this remote corner of Bengal, when the country was an uninhabited jungle, so full of tigers that not a day passed without one or more of the grass or wood-cutters being carried off. Now, thousands of acres are cultivated with rice, and during our stay we did not see a tiger. The quantity of land brought into cultivation in this part of Bengal, and indeed throughout the Gangetic delta, has probably been doubled during the last twenty years, and speaks volumes for the state of the peasant under the Indian Company's sway, as compared with his former condition. The Silchar rice is of admirable quality, and much is imported to Silhet, the Jheels not producing grain enough for the consumption of the people. Though Silchar grows enough for ten times its population, there was actually a famine six weeks before our arrival, the demand from Silhet being so great.

The villages of Cachar are peopled by Mahometans,

Munniporees, Nagas, and Cookies ; the Cacharies themselves being a poor and peaceful jungle tribe, confined to the mountains north of the Soormah. The Munniporees are emigrants from the kingdom of that name, which lies beyond the British possessions, and borders on Assam and Birmah. Low ranges of forest-clad mountains separate it from Silchar, to the south-east of which are interminable jungles, peopled by the Cookies, a wild Indo-Chinese tribe, who live in a state of constant warfare, and possess the whole hill country from this, southward to beyond Chittagong. A few years ago they invaded and ravaged Cachar, carrying many of the inhabitants into slavery, and so frightening the people, that land previously worth six rupees a biggah, is now reduced to one and a half. A strong party was sent to rescue the captives, and marched for many days through their country without disturbing man or beast ; penetrating deep forests of gigantic trees and tall bamboos, never seeing the sun above, or aught to the right and left, save an occasional clearance and a deserted village. The incursion, however, had its effects, and the better inclined near the frontier have since come forward, and been enrolled as the Cookie levy.

The Munnipore emigrants are industrious settlers for a time, but never remain long in one place : their religion is Hindoo, and they keep up a considerable trade with their own country, whence they import a large breed of buffalos, ponies, silks, and cotton cloths dyed with arnotto (*Bixa*), and universally used for turbans. They use bamboo blowing-tubes and arrows for shooting birds, make excellent shields of rhinoceros

hide (imported from Assam), and play at hockey on horseback like the Western Tibetans.

One fine moonlight night we went to see a Munnipore dance. A large circular area was thatched with plantain leaves, growing on their trunks, which were stuck in the ground; and round the enclosure was a border neatly cut from the white leaf-sheaths of the same tree. A double enclosure of bamboo, similarly ornamented, left an inner circle for the performers, and an outer for the spectators: the whole was lighted with oil lamps and Chinese paper lanterns. The musicians sat on one side, with cymbals, tomtoms, and flutes, and sang choruses.

The performances began by a copper-coloured Cupid entering and calling the virgins with a flute; these appeared from a green-room, to the number of thirty or forty, of all ages and sizes. Each had her hair dressed in a topknot, and her head covered with a veil; a scarlet petticoat loaded with tinsel concealed her naked feet, and over this was a short red kirtle, and an enormous white shawl was swathed round the body from the armpits to the waist. A broad belt passed over the right shoulder and under the left arm, to which hung gold and silver chains, corals, &c., with tinsel and small mirrors sewed on everywhere: the arms and hands were bare, and decorated with bangles and rings.

Many of the women were extremely tall, great stature being common amongst the Munniporees. They commenced with a prostration to Cupid, around whom they danced very slowly, with the arms

stretched out, and the hands in motion; at each step the free foot was swung backwards and forwards. Cupid then chose a partner, and standing in the middle went through the same motions, a compliment the women acknowledged by curtseying and whirling round, making a sort of balloon with their petticoats, which, however, were too heavy to inflate properly.

The Nagas are another people found on this frontier, chiefly on the hills to the north: they are a wild, copper-coloured, uncouth jungle tribe, who have proved troublesome on the Assam frontier. Their features are more Tartar than those of the Munniporees, especially amongst the old men. They bury their dead under the threshold of their cottages. The men are all but naked, and stick plumes of hornbills' feathers in their hair, which is bound with strips of bamboo; tufts of small feathers are passed through their ears, and worn as shoulder lappets; and they also wear brass armlets, and necklaces of cowries, coral, amber, ivory, and boars' teeth. The women draw a fringed blue cloth tightly across the breast, and wear a checked or striped petticoat. They are less ornamented than the men, and are pleasing looking; their hair is straight, and cut short over the eyebrows.

The Naga dances are very different from those of the Munniporees; being quick, and performed in excellent time to harmonious music. The figures are regular, like quadrilles and country-dances: the men hold their knives erect during the performance, the women extend their arms only when turning partners, and then their hands are not given, but the palms are

held opposite. The step is a sort of polka and balancelz, very graceful and lively. A bar of music is always played first, and at the end the spectators applaud with two short shouts. Their ear for music, and the nature of their dance, are as Tibetan as their countenances, and different from those of the Indo-Chinese tribes of the frontier.

Had we had time, it was our intention to have visited Munnipore, but we were anxious to proceed to Chittagong. I however made a three days' excursion to the frontier, about thirty miles distant, proceeding along the north bank of the Soormah. On the way my elephant got bogged in crossing a deep muddy stream: this is sometimes an alarming position, as should the animal become terrified, he will seize his rider, or pad, or any other object (except his driver), to place under his knees to prevent his sinking. In this instance the driver in great alarm ordered me off, and I had to flounder out through the black mud. The elephant remained fast all night, and was released next morning by men with ropes.

The country continued a grassy level, with marshes and rice cultivation, to the first range of hills, beyond which the river is unnavigable; there also a forest commences, of oaks, figs, and the common trees of east Bengal. On the east side of the range, the road descends to a broad valley covered with gigantic scattered timber-trees rearing their enormous trunks above the bamboo jungle: immense rattan-canes wound through the forest, and in the gulleys were groves of two kinds of tree-fern, with palms, screw-pines, &c.

The climate of Cachar partakes of that of the Jheels in its damp equable character ; the temperature seldom rising above  $90^{\circ}$  in summer, nor sinking below  $45^{\circ}$  in January : during our stay the weather was fine, and dense fogs formed in the morning.

There are few mosquitos, which is one of the most curious facts in the geographical distribution of these capricious blood-suckers ; for the locality is surrounded by swamps, and they swarm at Silhet, and on the river lower down. Both on the passage up and down, we were tormented in our canoes by them for eighty or ninety miles above Silhet, and thence onwards to Cachar we were free.

On the 30th of November, we were preparing for our return to Silhet, and our canoes were loading, when we were surprised by a loud rushing noise, and saw a high wave coming down the river, swamping every boat that remained on its banks, whilst most of those that pushed out into the stream, escaped with a violent rocking. It was caused by a slip of the bank three quarters of a mile up the stream, of no great size, but which propagated a high wave. This appeared to move on at about the rate of a mile in three or four minutes, giving plenty of time for our boatmen to push out from the land on hearing the shouts of those first overtaken by the calamity ; but they were too timid, and consequently one of our canoes, full of papers, instruments, and clothes, was swamped. Happily our dried collections were not embarked, and the hot sun repaired much of the damage.

On the 2nd of December we proceeded to Silhet, the

capital of the district of the same name, occupying a slightly raised part of the Jheels, where many of the Teelas seemed joined together by beds of gravel and sand. In the rains it is surrounded by water; in winter Jynteapore and Pundua may be reached by land, crossing innumerable creeks on the way.

The most interesting botanical ramble about Silhet is to the tree-fern groves on the path to Jynteapore, following the bottoms of shallow valleys, and along clear streams, up whose beds we waded for some miles, under an arching canopy of tropical shrubs, trees, and climbers. In the narrower parts of the valleys tree-ferns are numerous on the slopes, rearing their slender brown trunks forty feet high, with feathery crowns of foliage, through which the sunbeams trembled on the broad shining foliage of the tropical herbage below.

Silhet, though hot and damp, is remarkably healthy, and does not materially differ in temperature from Silchar, though the climate is more equable and humid. We thence took large boats to navigate the Burram-pooter and Megna, to their embouchure in the Bay of Bengal at Noacolly, a distance of 250 miles, whence we were to proceed across the head of the bay to Chittagong, about 100 miles further. We arrived at Chattuc on the 9th of December, where our Khasia collectors met us with large loads of plants, and we paid them off. The river was now low, and presented a busy scene, from the numerous trading boats being confined to its deeper channels.

On the 13th we entered the broad stream of the



**Megna.** Rice is cultivated along the mud flats left by the annual floods, and the banks are lower and less defined than those of the Soormah, and support no long grasses or bushes. Enormous islets of living water-grasses and other plants floated past, and birds became more numerous, especially martins and egrets. The sun was hot, but the weather otherwise cool and pleasant; the mean temperature was nearly that of Calcutta,  $69\frac{1}{2}^{\circ}$ , but the atmosphere was more humid.

On the following day we passed the Dacca river; below which the vegetation of the Sunderbunds commences: there is a narrow beach, and behind it a mud bank several feet high, supporting a luxuriant green jungle of palms, immense fig-trees, and tall betel-palms.

Towards the embouchure, the banks rise, the river expands into a muddy sea, and a long swell rolls in, to the disquiet of our fresh-water boatmen. Low islands of sand and mud stretch along the horizon; which, together with the ships, distorted by extraordinary refraction, flickered as if seen through smoke. We landed in a canal-like creek on the 17th, and walked to Noacolly,\* over a flat of hard mud, covered with turf. Noacolly is a station for collecting the revenue and preventing the manufacture of salt, which, and opium, are the only monopolies now in the hands of the East India Company. The salt itself is imported from Arracan, Ceylon, and even Europe, and is stored in great wooden buildings here and elsewhere. The ground being impregnated with salt, the illicit manufac-

\* "Colly" signifies a muddy creek, such as intersect the delta.

ture by evaporation is not easily checked; but whereas the average number of cases brought to justice used to be twenty or thirty in a week, they are now reduced to two or three. It is remarkable that though the soil yields such an abundance of this mineral, the water of the Megna at Noacolly is only brackish, and it is therefore to repeated inundations and surface evaporations that the salt is due. Fresh water is everywhere found at the depth of a very few feet, but it is not good.

The total breadth of the delta is 260 miles, from Chittagong to the mouth of the Hoogly, and is divided longitudinally by the Megna: all to the west of that river presents a luxuriant vegetation, while to the east is a bare, muddy expanse, with no trees or shrubs but such as are planted. On the west coast the tide rises twelve or thirteen feet; on the east from forty to eighty. On the west the water is salt enough for mangroves to grow for fifty miles up the Hoogly; on the east the sea-coast is too fresh for that plant for ten miles south of Chittagong. On the west, 50 inches is the Cuttack annual rain-fall; on the east, 90 to 120 at Noacolly and Chittagong, and 200 at Arracan. The east coast is annually visited by earthquakes, which are rare on the west; and, lastly, the majority of the trees and shrubs carried down from the Cuttack and Orissa forests, and deposited on the west coast of the delta, are not only different in species, but in Natural Orders, from those that the Fenny and Chittagong rivers bring down from the jungles.

At Noacolly we were glad to find that our observations on the progression westwards of the Burram-

pooter were confirmed by the fact that the Megna also is gradually moving in that direction, leaving much dry land on the Noacolly side, and forming islands opposite that coast; whilst it encroaches on the Sunderbunds, and is cutting away the islands in that direction. The advance of the fresh water amongst the Sunderbunds is destructive to the vegetation of the latter, which requires salt; and if the Megna continues its slow course westwards, the obliteration of a very peculiar flora over thousands of square miles, and the extinction of many species of plants and animals that exist nowhere else, may ensue. In ordinary cases these plants, &c., would take up their abode on the east coast, as they were driven from the west; but such might not be the case in this delta, for the sweeping tides of the east coast prevent any such vegetation establishing itself there, and the mud which the eastern rivers carry down becomes a caking dry soil, unsuited to the germination of seeds.

The main land of Noacolly is gradually extending seawards, and has advanced four miles within twenty-three years: this seems sufficiently accounted for by the recession of the Megna. The elevation of the land is caused by the overwhelming tides and south-west hurricanes in May and October; these extend for thirty miles north and south of Chittagong, and carry the waters of the Megna and Fenny back over the land, in a series of tremendous waves, that cover islands of many hundred acres, and roll three miles on to the main land.

We left Noacolly on the 19th for Chittagong, the

distance to which place is only 100 miles ; but the passage being considered dangerous at this season (during the spring tides), we were provided with a large vessel and an experienced crew. The great object in this navigation is to make progress towards the top of the tide and during its flood, and to ground during the ebb in creeks where the bore (tidal wave) is not violent; for where the channels are broad and open, the height and force of this wave rolls the largest coasting craft over and swamps them.

Our boatmen pushed out at 3 A.M., and brought up at 5, in a narrow muddy creek on the island of Sidhee. The waters retired along channels scooped several fathoms deep in black mud, leaving our vessel aground six or seven feet below the top of the bank, and soon afterwards no water was to be seen; as far as the eye could reach, all was a glistening oozy mud, except the bleak level surfaces of the islands, on which neither shrub nor tree grew. Soon after 2 P.M. a white line was seen on the low black horizon, which was the tide-wave, advancing at the rate of five miles an hour, with a hollow roar; it bore back the mud that was gradually slipping along the gentle slope, and we were afloat an hour after: at night we grounded again, opposite the mouth of the Fenny.

By moonlight the scene was oppressively solemn: on all sides the gurgling waters kept up a peculiar sound that filled the air with sullen murmurs; the moonbeams slept upon the shining surface of the mud, and made the dismal landscape more ghastly still. Silence followed the ebb, occasionally broken by the

wild whistle of a bird like the curlew; till the harsh roar of the bore was heard, to which the sailors seemed to waken by instinct. The waters then closed in on every side, and the far end of the reflected moonbeam was broken into flashing light, that approached and soon danced beside the boat.

On the 21st we were ashore at daylight on the Chittagong coast far north of the station, and were greeted by the sight of hills on the horizon: we were lying fully 20 feet below high water mark, and the tide was out for several miles to the westward.

We were three days and nights on this short voyage, without losing sight of mud or land; and arrived at Chittagong on the 23rd of December.

Chittagong stands on the north shore of an extensive delta, formed by rivers from the lofty mountains separating this district from Birmah. It is large and beautifully situated, interspersed with trees and tanks: in the hollows around are native huts amidst vegetation of every hue, glossy green figs, broad plantains, feathery Acacias, dark Nageesa, red-purple Terminalia, leafless scarlet-flowered Bombax, and grey Casuarina. The hills about the station are not more than 150 or 200 feet high, and are surmounted by good European houses, surrounded by trees of Acacia and Cæsalpinia.

Seaward the tide leaves immense flats, which stretch for many miles on either side the offing. Inland the views are beautiful, of the many-armed river, covered with sails, winding amongst groves of cocoa-nuts, palms, and yellow rice fields: while on the horizon, at the distance of 40 or 50 miles, rise mountains, 4,000

to 8,000 feet high; they are clothed with woods, abounding with the splendid timber trees of the Cachar forests, though, like these, they are said to want teak, Sal, and Sissoo: they have, besides many others, magnificent Gurjun trees, the monarchs of the forests of these coasts. They are inhabited by turbulent races, who are coterminous with the Cookies of the Cachar and Tippera forests, if indeed they be not the same people. The natives of Chittagong are Mahometans and Mugs, a Birmese tribe who inhabit many parts of the Malay peninsula, and the coast to the northward of it; they are excellent shipbuilders and active traders, and export much rice and timber to Madras and Calcutta.

To the south, undulating dunes stretch along the coast, covered with low bushes, of which a red-flowered *Melastoma* is the most prevalent, and is called a rhododendron by many of the residents.

Coffee has been cultivated at Chittagong with great success: it is said to have been introduced by Sir W. Jones. Both Assam and Chinese teas flourish, but Chinamen are wanted to cure the leaves. Black pepper succeeds admirably, as do cinnamon, arrow-root, and ginger.

Early in January we started on an excursion to the north, following a valley separated from the coast by a range of wooded hills 1000 feet high. For several marches the bottom of this valley was broad, flat, and full of villages. At Sidhee, about twenty-five miles from Chittagong, it contracts, and spurs from the hills on either side project into the middle: they are

200 to 300 feet high, formed of red clay, and covered with brushwood.

At Kajikehath, the most northern point we reached, we were quite amongst these hills, and in an extremely picturesque country, intersected by long winding flat valleys; some full of copse-wood, others presenting the most beautiful park-like scenery, and a third class expanding into grassy marshes or lake-beds, with wooded islets rising out of them. The hill-sides are clothed with low jungle, above which tower magnificent Gurjun trees (wood-oil). This is the most superb tree we met with in the Indian forests; it is conspicuous for its gigantic size, and for the straightness and graceful form of its tall unbranched pale grey trunk, and small symmetrical crown: many individuals were upwards of 200 feet high, and fifteen in girth. Its leaves are broad, glossy, and beautiful; the flowers (then falling) are not conspicuous; the wood is hard, close-grained, and durable, and a fragrant oil exudes from the trunk, which is extremely valuable as pitch and varnish, &c., besides being a useful medicine. The natives procure it by cutting transverse holes in the trunk, pointing downwards, and lighting fires in them, which causes the oil to flow.

On the 8th of January we experienced a sharp earthquake preceded by a dull thumping sound; it lasted about twenty seconds, and seemed to come up from the southward; the water of a tank by which we were seated was smartly agitated. The same shock was felt at Mymensing and at Dacca, 110 miles north-west of this place.

We crossed the dividing ridge of the littoral range, on the 9th, and descended to Seetakoond bungalow, on the high road from Chittagong to Comilla. The forests at the foot of the range were very extensive, and



OURJUN TREE.

swarmed with large red ants that proved very irritating: they build immense pendulous nests of dead and living



leaves at the ends of the branches of trees, and mat them with a white web. Tigers, leopards, wild dogs, and boars, are numerous; as are snipes, pheasants, peacocks, and jungle-fowl; the latter waking the morn with their shrill crows; and in strange association with these is the common English woodcock, which is occasionally found.

The trees are of little value, except the Gurjun, and "Kistooma," a species of *Bradleia*, which was stacked extensively, and used for building purposes. The papaw\* is abundantly cultivated, and its great gourd-like fruit eaten; the flavour is that of a bad melon, and a white juice exudes from the rind. The *Hodgsonia heteroclita*, a magnificent climber, grows in these forests; with a climbing Apocynous plant, the milk of which flows in a continuous stream, resembling caoutchouc (it is probably the *Urceola elastica*, which yields Indian-rubber).

The ascent of the hills, which are densely wooded, was along spurs, and over knolls of clay; the road was good, but always through bamboo jungle, and it wound amongst the low spurs, so that there was no defined crest or top of the pass, which is about 800 feet high. There were no tall palms, tree-ferns, or plantains, and altogether the forest was smaller and poorer in plants than we had expected.

From the summit we obtained a very extensive and singular view. At our feet was a broad, low, grassy,

\* The Papaw tree is said to have the curious property of rendering tough meat tender, when hung under its leaves, or touched with the juice; this hastening the process of decay. With this fact, well-known in the West Indies, I never found a person in the East acquainted.

alluvial plain, intersected by creeks, bounding a black expanse of mud which (the tide being out) appeared to stretch almost continuously to Sundeeep Island, 30 miles distant; while beyond, the blue hills of Tippera rose on the north-west horizon.

Descending, we rode several miles along an excellent road, to the bungalow of Seetakoond, twenty-five miles north of Chittagong. The west flank of the range we had crossed is much steeper than the east, often precipitous, and presents the appearance of a sea-worn cliff towards the Bay of Bengal. Near Seetakoond (which is on the plain), a hill on the range, bearing the same name, rises 1,136 feet high, and being damper and more luxuriantly wooded, we were anxious to explore it: we therefore spent some days at the bungalow. Fields of poppy and sun (*Crotalaria juncea*) formed most beautiful crops; the latter grows from four to six feet high, and bears masses of laburnum-like flowers, while the poppy fields resembled a carpet of dark-green velvet, sprinkled with white stars; or, as I have elsewhere remarked, a green lake studded with water-lilies.

The road to the top of Seetakoond leads along a most beautiful valley, and then winds up a cliff that is in many places almost precipitous, the ascent being partly by steps cut in the rock, of which there are 560. The mountain is very sacred, and there is a large Brahmin temple on its flank; and near the base a perpetual flame bursts out of the rock. This we were anxious to examine, and were extremely disappointed to find it a small vertical hole in a slaty rock, with a lateral one below for a draught, and that it was daily

supplied by pious pilgrims and Brahmins with such enormous quantities of ghee (liquid butter), that it was to all intents and purposes an artificial lamp ; no trace of natural phenomena being discoverable.

On the dry but wooded west face of the mountain, grew many beautiful palms, with dwarf date-palm, and Gurjun trees. The east slope of the mountain is damper, and much more densely wooded ; we there found two wild species of nutmeg trees, whose wood is full of a brown acrid oil, seven palms, tree-ferns, and many other kinds of ferns, several kinds of oak, *Dracæna*, and figs. The top is 1,136 feet above the sea, and commands an extensive view to all points of the compass ; but the forests, in which the ashy bark of the Gurjun trees is conspicuous, and the beautiful valley on the west, are the only attractive features.

The weather on the east side of the range differs at this season remarkably from that on the west, where the vicinity of the sea keeps the atmosphere more humid and warm, and at the same time prevents the formation of the dense fogs that hang over the valleys to the eastward every morning at sunrise. We found the mean temperature at the bungalow, from January 9th till the 13th, to be 70°.

We embarked again at Chittagong for Calcutta, on the 16th of January, at 10 P.M., in a very large vessel, rowed by twelve men : we made wretchedly slow progress, being for four days within sight of Chittagong ! On the 20th we only reached Sidhee, and thence made a stretch to Hattiah, an island which may be said to be moving bodily to the westward, the Megna

annually cutting many acres from the east side, and the tide-wave depositing mud on the west. The surface is flat, and raised four feet above mean high-water level; the tide rises about 14 feet up the bank, and then retires for miles; the total rise and fall is, however, much less here than in the Fenny, higher up the gulf. Two kinds of tamarisk, and some thorny shrubs, are the only bushes on the eastern islands; on the central ones a few dwarf mangroves appear, with the holly-leaved *Dilivaria*, dwarf screw-pine, and a curious fern, a variety of *Acrostichum aureum*. Towards the northern end of Hattiah, Talipot, cocoa-nut and date-palms appear.

On the 22nd we entered the Sunderbunds, rowing amongst narrow channels where the tide rises but a few feet. The banks were covered with a luxuriant vegetation, chiefly of small trees, above which rose stately palms. On the 25th, we were overtaken by a steamer from Assam, a novel sight to us, and a very strange one in these creeks, which in some places seemed hardly broad enough for it to pass through. We jumped on board in haste, leaving our boat and luggage to follow us. She had left Dacca two days before, and this being the dry season, the route to Calcutta, which is but sixty miles in a straight line, involved a *détour* of three hundred.

From the masts of the steamer we obtained an excellent *coup-d'œil* of the Sunderbunds; its swamps clothed with verdure, and intersected by innumerable inosculating channels, with banks a foot or so high. The amount of tide, which never exceeds ten feet,

diminishes in proceeding westwards into the heart of these swamps, and the epoch, direction, and duration of the ebb and flow vary so much in every canal, that at times, after stemming a powerful current, we found ourselves, without materially changing our course, suddenly swept along with a favouring stream. This is owing to the intricate ramifications of the creeks, the flow of whose waters is materially influenced by the most trifling accidents of direction.

Receding from the Megna, the water became salter, and *Nipa fruticans* appeared, throwing up pale yellow-green tufts of feathery leaves, from a short thick creeping stem, and bearing at the base of the leaves its great head of nuts, of which millions were floating on the waters, and vegetating in the mud. Marks of tigers were very frequent, and the footprints of deer, wild boars, and enormous crocodiles: these reptiles were extremely common, and glided down the mud-banks on the approach of the steamer, leaving between the footmarks a deep groove in the mud made by their tail. The *Phoenix paludosa*, a dwarf slender-stemmed date-palm, from six to eight feet high, is the all-prevalent feature, covering the whole landscape with a carpet of feathery fronds of the liveliest green. The species is eminently gregarious, more so than any other Indian palm, and presents so dense a mass of foliage, that when viewed from above, the stems are wholly hidden.

The water is very turbid, and only ten to twenty feet deep, which, we were assured by the captain, was not increased during the rains: it is loaded with

vegetable matter, but the banks are always muddy, and we never saw any peat. Dense fogs prevented our progress in the morning, and we always anchored at dusk. We did not see a village or house in the heart of the Sunderbunds (though such do occur), but we saw canoes, with fishermen, who use the tame otter in fishing; and the banks were covered with piles of firewood, stacked for the Calcutta market. As we approached the Hoogly, the water became very salt and clear; the Nipa fruits were still most abundant, floating out to sea, but no more of the plant itself was seen. As the channels became broader, sand-flats appeared, with old salt factories, and clumps of planted *Casuarina*.

On the 28th of January we passed Saugor island, and entered the Hoogly, steamed past Diamond Harbour, and landed at the Botanic Garden Ghat, where we received a hearty welcome from Dr. Falconer. Ten days later we bade farewell to India, reaching England on the 25th of March, 1851.

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